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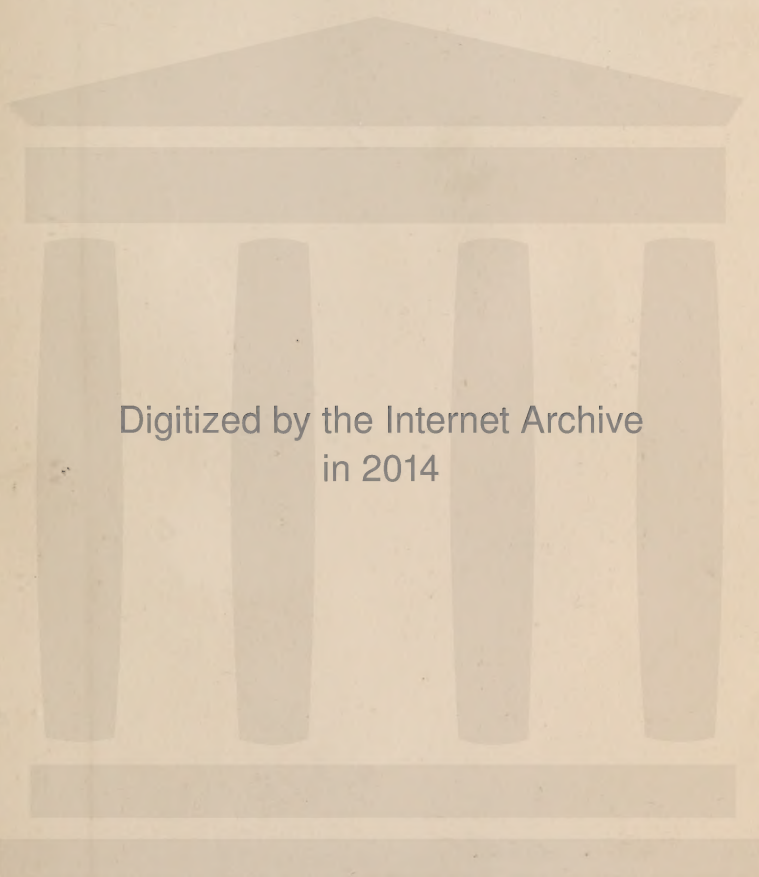
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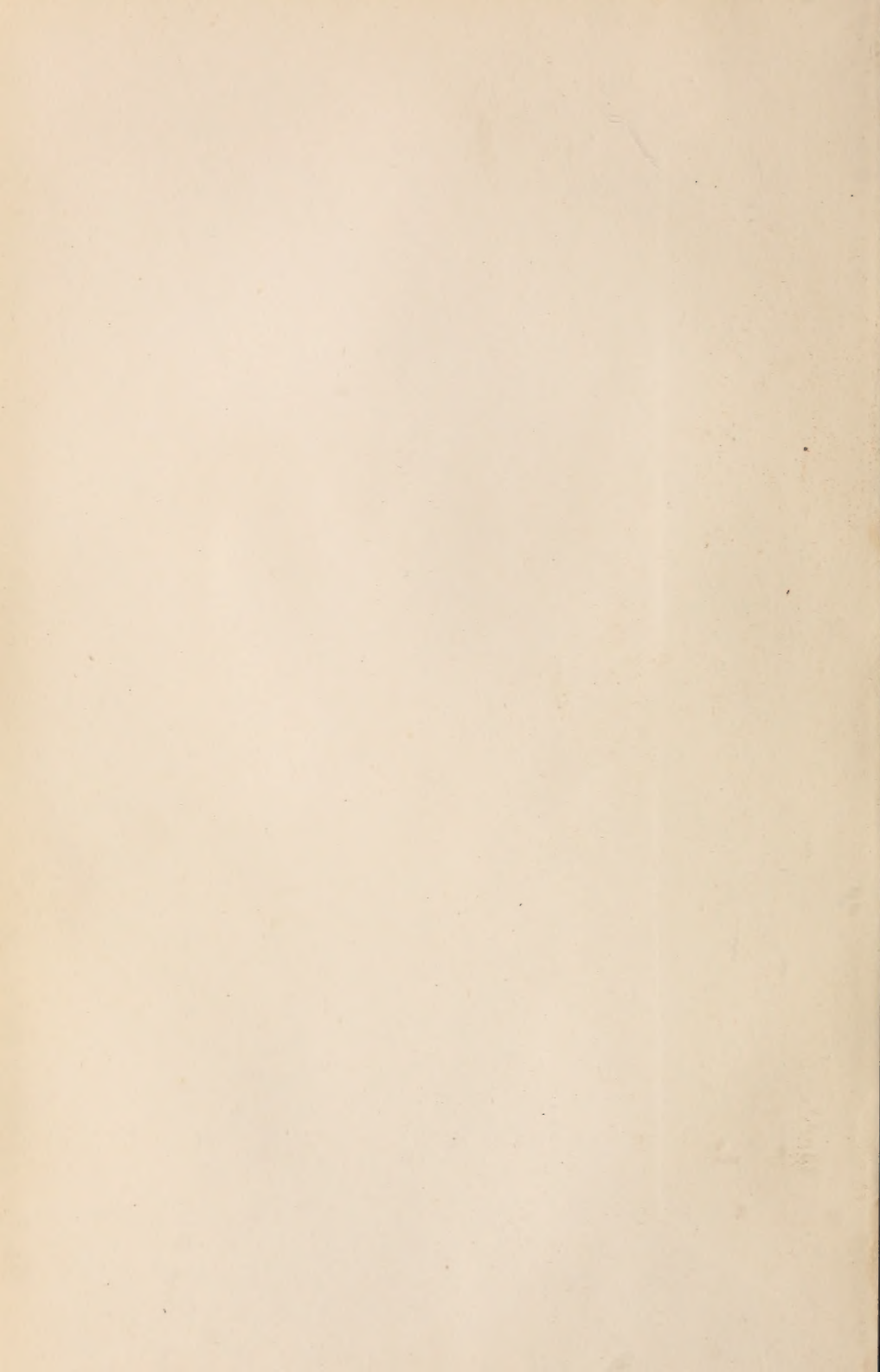
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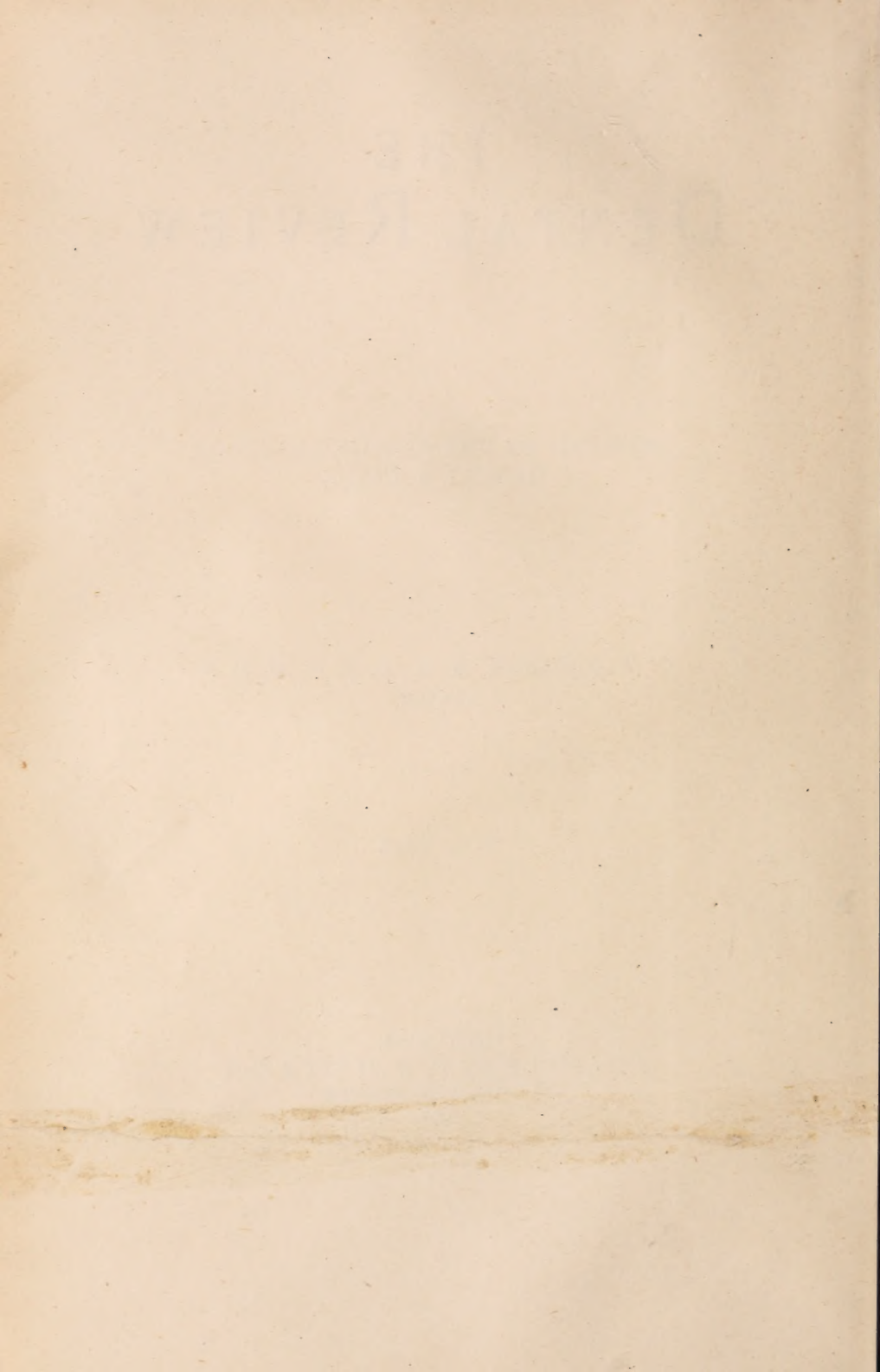
THE DENTAL REVIEW

DEVOTED TO THE ADVANCEMENT OF
DENTAL SCIENCE

C. N. JOHNSON, M. A., L. D. S., D. D. S.
EDITOR

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No. 1

THE GOLD INLAY.*

BY J. V. CONZETT, D. D. S., DUBUQUE, IOWA.

The gold inlay needs no apologist at this time, for in the seven years that the cast gold inlay has been before the profession it has demonstrated its right to a large place in the armamentarium of the operative dentist. Not only has it demonstrated its usefulness to the dentist and its beneficence in mitigating the stress of dental operations to the patient to such a degree that it is given a place among the recognized materials for the filling of carious teeth, but in the minds of a very large number of the best men in the profession it is crowding gold foil very hard for *first* place in the list of best materials, and in the opinion of many holds that place without question.

I do not wish to detract from the gold foil filling any of the honor that has been given to it by the many good operators of the past and present. It always has been and still is the king of filling materials. A gold filling properly made is one that will last as long as the tooth stands, and if there were no other consideration than the permanency of the filling I would be the last to advocate any other material or method, but, unhappily there are other considerations, and those of so weighty a character that we are compelled to give them due thought.

In the first place the making of a gold foil filling is a very difficult operation. By a good filling I mean one that has all of the qualities of a filling necessary to permanently save the tooth, that is it must have the property of impermeability, the gold must be so thoroughly condensed that it will to the greatest possible extent eliminate air spaces so that there will not be a spongy mass of gold in the tooth to act as an absorbent of the fluids of the mouth,

*Read before the Chicago Dental Society, Oct. 20, 1914.

rather than a hygienic metal plug perfectly filling the cavity in the tooth. Only those that have made a study of fillings that have failed have any conception of the number of gold fillings that are inserted that fail to be condensed sufficiently to make an impermeable mass. If you have any doubts in the matter take the fillings that you remove from teeth and hold them over an alcohol lamp and see if they do not blacken and burn out the carboniferous material that has been absorbed during its life as a filling.

The filling must be perfectly adapted to the walls of the cavity that the fluids of the mouth may be prevented from leaking in between the filling and the tooth, for we know that that is the prime requisite of a filling, and yet we all know that the blue margins around the fillings that come to us are not as rare as we might wish them to be.

The filling must have a perfect contour to replace the lost tissue comfortably; it must have the occlusal anatomical markings reproduced, and the proper occlusion perfectly restored, and we know how hard it is to do these things with a material as intractable as gold foil, so the consideration of difficulty of manipulation is not an idle one. And yet were that the only consideration I would be ashamed to advocate it, for the man that is not willing to overcome difficulties in order to give his patients the best is not worthy of success.

Perhaps the greatest consideration in my mind is the stress that the patient has to endure in the making of a large gold filling in a cavity in a molar or bicuspid. I believe that it is our duty to relieve our patients of their disabilities in the easiest way that is consistent with perfect results. I do not wish to be understood as saying that I would choose the easiest way, for if the easy way were not as good as the hard way I should not hesitate a minute unless there were some other consideration that was weighty enough to over-balance the good of the harder way, but I do mean to say that of two or more methods that have the merit of doing as good service it is our duty to use that which will cause our patients the least physical distress, and if there is a method that is being introduced that has that merit it is our duty even at the expense of abandoning methods that have become second nature to us, to acquire the ability to use the more humane method.

If then the gold inlay possesses the qualities that we demand of

a good foil filling and in addition to these has the advantage of ease of manipulation and greater comfort to the patient during its insertion, we will not only be justified in its use, but our humane instincts will demand it.

That the use of the gold inlay is infinitely easier on the patient goes without saying; so much is this the case that it is difficult to make a gold filling for a patient that has had both methods tried upon him for the reason that he seriously objects to the stress of having a gold filling made when an inlay can be used.

The only question for us to settle then is whether the inlay is as good a tooth saver as the gold filling. In answering that question the personal equation plays so great a part that it is difficult to arbitrarily say that a gold inlay will save a tooth as well as a gold filling, for we may compare a good foil filling with a poor inlay or vice versa. I can say, however, without fear of successful contradiction that a poor inlay is vastly superior to a poor gold filling, for the cement lining will preserve the tooth for a long period of time even though the inlay does not fit the cavity; indeed I have seen inlays that did not seem to have been made for the cavity in which they were placed, so great was the discrepancy between the inlay and the tooth, and yet there was no decay around the margins. I have two such inlays under observation now that have been in the teeth for four or five years and though there have been other cavities in the patients' teeth, showing that there was a susceptibility to decay, there was no decay around these imperfect inlays. If a poorly made gold filling is placed in a tooth the leakage commences immediately and failure begins as soon as the rubber dam is removed from the tooth.

So much is this true that I have heard men say that it was impossible for them to make gold fillings that would save the tooth for any length of time. Such an admission was confessedly a mark of the individual's incapacity as an operator, and yet there are men in successful practice that recognize their limitations in that respect. Again let me emphasize the fact, for it is a fact, that a good gold filling will perfectly save the tooth for all time and there are legions of men in the profession that are capable of making them.

One of the inlay enthusiasts has recently said that there are a great many men that are abandoning the use of the inlay because

of the many failures that they are having in their practice. I believe that that assertion is true to some extent, and is only what was to be expected and that which the writer prophesied several years ago when he beheld the slovenly methods that were being used in the making of inlays. The inlay method is not one that adapts itself to slovenly, careless methods and the men that try to cut corners and slap in inlays by the wholesale method are bound to have failures, but an experience of seven years with the gold inlay leads me to say that with the same care that you would use in the making of a gold filling you will have as great a percentage of success, and I venture the assertion that the average operator will have a greater percentage of successes than he had with the filling.

When we analyze the failures of the gold inlay we will find that in the very large majority of cases it is due to the inlay falling out of the cavity and not to a recurrence of decay. There are failures owing to a recurrence of decay, but these failures are not due to any inherent defect in the inlay method, but invariably to a faulty cavity preparation, for if the margins of the cavity are not carried into the immune areas there is a liability to decay no matter what material is used in filling the cavity. An inlay will not protect the tissue outside of the cavity any better than a filling and in a failure to properly extend the margins it is the territory immediately contiguous to the fillings that is the seat of recurrent caries and not the tissue between the filling and tooth, as it is in infiltration decay. In the case of failures due to the filling falling out of the cavity we again have a failure due to cavity preparation. In fact the whole problem is so much one of cavity preparation that we could profitably spend the whole time at our disposal in a consideration of that question.

I have frequently said that the preparation of the cavity for the insertion of a filling was the same no matter what was the material that was to be used in making the filling, and I want to reassert that now. Whether we are to make a filling of gold or amalgam, or an inlay of any material the fundamental principles of cavity preparation as laid down by Dr. G. V. Black are the same. We will have to make some slight changes as the exigencies of the materials and methods may demand, for instance, we cannot make any undercuts of any description for an inlay, and we cannot bevel the cavo-surface angle in the making of a *porcelain*

inlay, but in all essentials the methods are the same, and in proportion to the observance of these principles in the preparation of our cavities will by our success in the making of any inlay or filling.

It will not be possible for me to outline a procedure for the preparation of all of the cavities that we are called upon to fill, neither do I think that would be necessary in the home of the great master of operative dentistry. If you have not made his work upon this all important subject your very own, do so at your earliest convenience, and the difficulties of cavity preparation will fade away, so completely has he mastered the subject.

In all cases there must be a careful study of conditions and then a plan to adopt the principles of cavity preparation as laid down, to the case under consideration.

There must be first the outline form, which comprehends the extension for prevention and the esthetic form. As I said before it is as necessary to extend the cavity into immune territory for an inlay as it is for a filling. We find this law frequently violated in the making of a cavity for an inlay, for men seem to think that it is necessary to make their inlays cone shaped in order to have the wax draw and the inlay go to place. As a consequence the linguo-gingival and bucco-gingival angles are well within the embrasures and in decidedly susceptible territory. This is not at all necessary for the wax will draw perfectly if the angles are properly squared out and placed in an area that will be kept clean. This can be done without the making of any undercuts by cutting directly down from the occlusal surface with a straight fissure bur, being careful that the bur is always so held that the cut is parallel with the wall on the opposite side of the cavity. The gingival margin should be placed so far gingivally that it will be covered with the gum, and all of the fissures upon the occlusal surface should be cut out to smooth territory that the margin of the inlay will be placed in contact with a smooth surface. The esthetic form is that which will best conserve the beauty of the tooth and is the same for an inlay as for a filling so we will not spend any time upon it.

The resistance form is the next to be obtained and must depend for its width and depth upon the amount of stress that the finished inlay is called upon to resist. It would be foolish and cruel to cut as widely and deeply for an inlay in a tooth that had

no occlusion or one that was insignificant, as it would for one that had to resist an occlusal stress of 250 pounds at every thrust of the jaws in mastication. Hence the necessity for the study of conditions and the adjusting of restorative measures to the necessities of the case under consideration.

The resistance form is best secured by making the cavity with flat seats and parallel walls. The flat seat is the best form that we can possibly obtain to resist thrust stress and the paralleling of the walls of the cavity is the best form to give an inlay cavity to resist the pull stress that the inlay will have to resist, for it, in the greatest degree, gives the frictional resistance upon which we have to depend so much in the retention of the inlay. We cannot depend upon the cements to hold our inlays in place unless they have as much mechanical retention as it is possible for us to give them. In bicuspid and molars we always use the step cavity in proximal surfaces and that gives us an additional retention. In speaking with one of our very good operators this summer he said that he had abandoned the paralleling of the walls of the cavities in his inlay preparations for the reason that he found so much difficulty in releasing the inlay from the cavity after trying it in. That is one of the best arguments that I have ever heard for the making of the cavity in that way, for we want our inlays to fit so snugly and have so good a mechanical retention that it is difficult to get them out of the cavity, but we have no difficulty in doing so by using the following method. Take a "Black" back action foot plugger number seven and place the point in the inter-proximal space just above the contact point and have your assistant strike a sharp blow or two upon it and the inlay will be readily displaced. In the case of a cavity in the occlusal surface of a molar or bicuspid I never mallet it to place until I have placed my cement in the cavity for I know that if I do with the cavity preparation such as we advocate, that we will not be able to get the inlay out of the cavity for cementation. In those cases I try the inlay in lightly and satisfy myself that all is well and then proceed with cementation.

The retention form is cared for in the inlay with the paralleling of the walls and needs no further discussion except for special cases for which we will have no time.

I wish to emphasize the preparation of the cavo-surface angle and to condemn with all the force of my influence the making of

the butt margin. We advocate the making of the beveled margin and do so for three reasons. First: the enamel margins should be beveled so that there will be no short rods upon the surface to fall out under stress and leave a vulnerable place between the inlay and tooth. Our study of the histological structure of the enamel will be sufficient evidence to convince us of the wisdom of that course. Second: the beveling of the margin around the cavity will cause a flange to be cast upon the margin of the inlay which will enable the operator to burnish the gold to perfect contact with the tooth immediately after the cementation of the inlay, and Third: if an inlay made with a butt joint at the gingival margin of an inlay that is to be placed in a cavity in the proximal surface of a bicuspid or molar, it will leave a thin plate of cement exposed to the action of the fluids of the mouth. We know that cement cannot be compressed thinner than the $1/1000$ of an inch, therefore, no matter how closely our inlay fits there will be a thin plate of cement between the inlay and tooth and if the butt joint is used the constant pounding of the forces of mastication will have a tendency to break up this thin exposed plate of cement and the particles will fall out and leave just that much discrepancy between inlay and tooth. For these reasons we advocate the beveled joint and experience justifies our recommendation.

One of the fruitful causes of failure is the lack of depth to the cavity. The cavity must be cut sufficiently deep to enable the inlay to lay hold on the walls of the cavity with sufficient grasp to enable it to resist the forces that tend to dislodge it. We have frequently seen inlays that have been placed in cavities that were scarcely cut through the enamel. It is not possible for us to say just how deep every cavity should be for here again the study of conditions plays an important part and the judgment of the operator must be called into play. Cut deep enough. I believe that the most important part of the art of filling teeth is the science of cavity preparation, but no matter how perfectly the cavity may have been prepared if the filling does not hermetically seal the cavity for all time the filling will fail sooner or later.

The gold inlay by reason of its lining of cement will save the tooth for a time even though it is very imperfect and that fact is at once the strength and the weakness of the inlay. It is its strength because it does save the tooth for an indefinite time even if the

technique of the operator is faulty, it is its weakness in that the operator finds that his inlays are saving the teeth even though he has placed inlays he knew were faulty and in consequence he grows careless and more and more negligent until he will be rudely awakened some day by a wholesale quantity of failures which are simply the cumulative effects of his past negligence.

A gold inlay that is not perfect will save the tooth for a while and will save some teeth permanently, but an inlay that imperfectly fits the tooth and leaves a space that is filled with cement that may wash out, is a constant menace to the tooth and will in the large majority of cases, fail at some time. It is therefore necessary that the inlay shall fit the cavity as perfectly as possible.

In order to have a perfect reproduction of the cavity we must have a wax that does not change its volume. It must neither shrink or expand at changes of temperature, we must have an investment material that is as perfect, and we must have a metal that will perfectly fill the perfect mold without expansion or contraction. We have none of these desirable materials and therefore must so perfect our technique that we will be able to take advantage of the known qualities resident in these materials and in so doing obtain an inlay that will practically fit the cavity so perfectly that the permanent salvation of the tooth is assured.

After finishing the cavity preparation a wax is chosen that is hard at mouth temperatures. There are a number of such upon the market. My personal preference is the Taggart wax. The manipulation of the wax is very important. It should be well warmed but not melted and of such consistency that it can be forced into the deepest parts of the cavity. If too soft it will be difficult to adapt it perfectly and the same is true if too hard, but a little experience will demonstrate the proper consistency for every case. After the wax is thoroughly condensed into the cavity the elasticity is released. This is important because according to the experience of Dr. Weston A. Price, wax that has been compressed has a tendency to resume its normal condition upon the release of pressure, so that a wax that has been pressed into a cavity will change its shape after it has been released from the confines of the cavity, particularly is this the case if the wax becomes warm. If, however, the wax is warmed in the cavity the elasticity is released while the wax is still in the cavity and the shape that it then assumes

will be held as the wax is in its normal condition. We have some models with us that will illustrate this proposition.

The cavity in which the models were made is a complicated one and one that has been thought to be very difficult to cast in one piece with perfect results. The fact is that in the past I have taught the making of M.O.D. inlays in two pieces to overcome the difficulty of making a perfect fit in the larger casting. That is now all done away with and we can make an M.O.D. inlay fit the cavity as perfectly as an M.O., as the models will show.

The first inlay is one that will cast without releasing the elasticity, and will not go down into the cavity because the distortion of the wax was so great that the axial walls of the inlay are pinched together to such an extent that the inlay will not go to the bottom of the cavity by as much as a full millimeter.

In the next model we have the same inlay cast in the same wax in the same way except the elasticity of the wax was released before the model was removed from the cavity. The inlay goes perfectly to place and when the margins are burnished makes a beautiful restoration. Before the margins were burnished, however, there was a very slight discrepancy at the gingival margins, due to the slight shrinkage of the gold. This shrinkage in the long dimension of an inlay is great enough to make an imperfection at the gingival margin that might cause trouble in some cases if not burnished to contact, hence the value of the flange made by the mould in contact with the beveled cavo-surface angle. In the next model we illustrate a method of overcoming that slight discrepancy. The cavity is prepared as the model illustrates with flat seats and parallel walls and the cavo-surface angle with all of its surfaces flowing into the cavity, when the model is removed from the cavity a small portion of the wax is carved away from the inner surface of the model at the contact with the pulpal and along the axial walls, so that when the inlay is cast it is malletted into the cavity and the incline of the cavo-surface angle allows it to fit into the cavity to the extent of the slight shrinkage at the gingival margin and a perfect fit is obtained. While the fit is perfect at the gingival margin, as can be seen, the seating of the inlay into the cavity to accomplish that result is so slight that there is no visible effect of it at the occlusal surface.

Beautiful results may also be obtained by the indirect method,

and we have several models illustrative of the effects obtained thereby.

In the indirect method the cavity preparation is the same as in the direct, the difference is in the making of the model.

A suitable tray is prepared for each case and an impression is obtained with modeling compound. A die is made from this impression in a good amalgam and the wax model made in the amalgam die, when the process of investment, casting, etc. is the same as in the direct method. The exponents of this method claim to obtain better results than they could obtain by the direct method, but though I have faithfully tried I have not been able to better the results obtained by the direct method, and I feel confident that the advocates of the indirect would be able to obtain as good results with the direct if they followed the technique we have attempted to expound.

A model should be invested in a good investment material, (and there is no better than the "Taggart"), as soon as the model is obtained, then as soon as hard should be burned out. The burning out should not proceed to the extent of disintegrating the plaster. Our custom is to heat until in a perfectly dark room there is the slightest shade of red observed when looking into the sprue hole. At this temperature there is no disintegration of the plaster and as a consequence no distortion of the inlay through a breaking of the weakened mould. We do not like to exert a pressure over five or six pounds upon our fluid gold for we find that that is sufficient to make a perfect casting and does not endanger the mold, and we believe that the cause of many distorted-castings is attributable to too great a stress upon the mold and a giving way of some part or the whole of the same. For that reason we prefer the "Taggart" machine that we may perfectly control the amount of pressure exerted upon each inlay and to be sure that the pressure is always the same.

An inlay should always be cast cold, that is the flask should be allowed to cool off before the casting is made, for if not the inlay will be too large for the cavity by reason of the expansion of the flask and investment material. If the casting is to be an overlay, as in the making of a cast gold crown, for instance, then the inlay should be cast in a hot mould.

To be a success a filling must not only preserve the tooth from the ingress of moisture and micro-organisms, and prevent a recurrence of decay around the filling, but the filling must restore the original contour of the tooth, have a good contact with the approximating tooth and should reproduce the anatomical markings of the tooth.

The gold inlay gives us a splendid method of reproducing the contour, for we can very easily carve the shape of the tooth in the impressionable wax, and it is then faithfully reproduced in the inlay. In this particular I think that the inlay method has improved the operations of the average dentist one hundred per cent. The contact is also easily reproduced, but in this respect I fear that all men are not as careful as they might be. It is necessary to remove a little of the contact in the wax in order to remove the model from the cavity, and many men seem to let it go at that, and have as a result an open or at any rate a loose contact. In the model this slight amount that it was found necessary to cut off should be restored. This is easily done by adding a little melted wax at the point of contact, or can be as efficiently obtained by placing the sprue wire at the contact point and then cutting off enough of the sprue to make the desired contact.

In cases where the stress of occlusion is great and there is much wear on the contacts it is advisable to restore them by sweating in a piece of 22k solder on the contact point.

It is very desirable to reproduce the occlusal markings in the finished inlay or filling, and it is a difficult matter to perfectly obtain in the foil filling, and is rarely found. The foil fillings are usually finished smooth and give a minimum of masticating efficiency as a result. These markings are easily obtained with the inlay and should always be made. In this way the artistic genius of the dentist is able to restore the full masticatory efficiency of the tooth to the patient instead of giving him simply the makeshift of a smooth surface on which to chew. Not only is it advisable to restore the marginal ridge for the purpose of efficiency in mastication, but if the ridge is properly restored and the sulci carved in the inlay the food in mastication will be forced toward the center of the tooth instead of toward the proximal surface, where the tremendous force of mastication would crowd it into

the interproximal space if the contacts and embrasures were not perfectly restored.

The inlay offers an easy and perfect method of making these restorations and they should always be reproduced in the inlay. The markings can be roughly made in the model in the mouth and carved to a more perfect reproduction after removal from the cavity, and then finished with a small round bur and a graver when the inlay is ready for insertion.

Pure gold gives the most perfect casting but is too soft to resist the stress that will come upon the finished inlay. Gold is softened by heating and tempered by malleting, so that a cast inlay finds the gold in its softest condition while a malleted filling is tempered by the process of malleting and a good well condensed foil filling finds the gold in its hardest condition. It is therefore obligatory to obtain the necessary hardness for the inlay in some other way, and we do this by alloying the gold with a metal that will give it the necessary resistance. For the average inlay an alloy of 23 karat is all that is necessary and in our practice is obtained by melting equal parts of 24 and 22 plate, which gives us an alloy of approximately 23k. If the inlay is for a resoration that will be required to resist a great deal of stress an alloy of 5% platinum is used to advantage.

After the inlay is cool it is pickled in a bath of hydro-fluoric acid, this to remove every trace of the investment material. Carefully examine the inlay with a magnifying glass for small bubbles that may have occurred in the investment and if not removed would prevent the inlay from properly seating. The inlay should now be roughly finished and is then ready to try in the cavity. It should be thoroughly malleted to place to cause it to properly seat and then should be burnished all along its margin. It is then our custom to go over the surface with a tantalum burnisher in the engine and burnishing toward the margins effectually seal them by flowing the gold into immediate contact with the tooth.

The gingival margin is carefully examined for overhang and if any is found is perfectly removed and the gold burnished to contact with the tooth. We have found many imperfections in this respect in the examinations which we have conducted and have become convinced that the error has been made possible by the habit

of allowing the patient to bite into the wax as it is placed in the tooth and the wax is distorted and pushed out at the gingival margin while still retaining the marking of that margin thus causing the operator to finish to that impression and leaving a great overhang in the finished inlay. Do not allow the patient to bite into the wax after you have adapted it to the cavity, but carve to occlusion, and if you find that you must have them bite into the wax in some cases, heat the surface of the wax with a ball burnisher and while the wax is warm take the bite. In doing this you only warm the surface of the wax and as the body of the model is hard the biting into the warmed surface will not disturb the mass.

Those of us who remember the splendid paper upon gingival irritations caused by faulty crowns and fillings by Dr. Arthur Black, will not need to be warned of the danger in allowing overhanging inlays, but unfortunately everybody has not yet been reached by that message. Carefully examine all margins and if perfect the inlay is then removed and is ready for cementation.

The cavity is washed out with warm water and then the tooth dried and washed out with alcohol to sterilize and cleanse from mucus or oil deposits and the inlay is then cemented to place, thoroughly malleted and before the cement has set, the margins are again burnished and the cement line reduced to its absolute minimum.

The final polishing is allowed to go for a future sitting and may be carried as far as you please.

Our experience with the inlay made in this manner leads us to confidently expect them to give a service that is only to be measured by the life of the patient. We do not claim infallibility, nor do we say that we never have any failures, but we do say that such failures as we have are always attributable to the failure to observe some of the fundamental principles of the art of filling teeth with the inlay and not to any inherent defect in the method.

To sum up the success of the inlay depends.

First: On the cavity preparation,

Second: On the proper making of the model,

Third: On the investment and casting, and

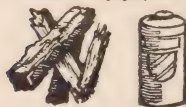
Fourth: On the finishing and cementation.

THE GOLD FOIL FILLING.*

BY ARTHUR D. BLACK, A.M., M.D., D.D.S., CHICAGO.

In introducing the subject assigned to me, I have thought that it might be of interest to review very hastily some of the more important events which have aided in the development of our present knowledge of the use of gold foil in filling operations, and for this purpose I have selected several illustrations and quotations found in original publications. Time does not permit us to make this complete or to go into details. My principal object will be to fix in your minds certain events in their proper

Seen Arznei
 Dieselbigen güt vnnnd ge/
 funde zubehalten/Auch allerhande
 gebrechen/mängel vnnnd weertagen
 der Zeen on allen schaden vnnnd
 schmerzen/zubehalten vnnnd
 vnd heilen.
 Alte schaden/löcher vnnnd heil-
 len in geringem kossen vnnnd gründ-
 lich zubeylen/Ale dem holtz Gna-
 iaco/ds Frantzosen oder Holz
 des lebens genant.
 Den Erbgetrindt an alten vnnnd
 jungen zubecken/vnnnd wider
 zumb harte zuziehen.



M. D. LIX,

Fig. 1. Reproduction of title page of anonymous German book on dentistry, published in 1559.

chronological order so that those who may not have reviewed the literature along this line may have a better understanding of the progress which the profession has made.

The earliest dental book of which I have knowledge, published anonymously in German in 1530, mentions the use of gold leaf for filling cavities in the teeth. I am fortunate enough to have a perfect copy of a little later edition of this book, published in 1559. In this book, the reference to the use of gold foil

*Read before the Chicago Dental Society, October 20, 1914.

is such that we may believe that it was then and probably had been for many years a regular plan of procedure. Gold has therefore been used for this purpose for at least four centuries and possibly much longer.

It seems fair to presume that up to about 1850 all gold fillings were made of non-cohesive foil, which was packed into the cavity by the wedging process. This required that the cavity should have four surrounding walls, and it was therefore impossible to restore the tooth form whenever a cavity involved two surfaces of a tooth. In cases of decays involving both proximal and occlusal surfaces a V-shaped file was used to cut

**Zum dritten das man die ausholung
wegt nimmet/welchs auch auf zweyerley
weyse geschicht/ Zum ersten das man das
loch vnd die aufsfressunge mit einem sub-
tilen meisselchen ader messerchen weilt/
ader mit einem andern instrument darzu
bequemlich/wegt schabe/vnd reinige/
als dy practickanten wol wissen/vnd dar-
zu erhaltung des andern teyles des zanes
das löchlichen mit golt blettern zu fullet.
Zum andern das man gebrauchte erztey
darzu dinlich welchs geschicht mit Galles
epffel vnd wilder galgen so der zan nach
der reinigung darmit wirdt gefüllet.**

Fig. 2. Reproduction of paragraph from anonymous German dental book, in which use of gold foil is mentioned. The translation is: In the third plan, the hollow place is done away with, which is done in one of two ways. First, the soft part of the cavity and the decayed part is cut away with small chisels, knives, files or other suitable instruments, and cleaned, as is well known to practitioners. Then for the saving of the remaining parts of the tooth, the cavity is filled with gold leaf. Otherwise one may use a suitable gum prepared with nutgalls and hyssop to fill the cavity after cleaning it.

away the proximal and occlusal surfaces so that a simple cavity might be formed with its surrounding walls at right angles to this filed surface. After the fillings were placed the same file was used to finish them. This left a broad V-shaped space between the teeth with the point of the V toward the gingivae. These inclined planes caused the food to be forced upon the septal gingivae, which continued until this tissue was destroyed

by suppuration, and in many cases the entire denture became a wreck.

While very serviceable and dependable fillings may be made with non-cohesive gold, it was very unsatisfactory as applied to proximo-occlusal cavities, because it was impossible to restore proper contacts. There being no very great advantage of this plan over other later developed procedures, it has gradually gone almost entirely out of use, and the special instruments required may be found today only in our museums or the cabinets of a very few of our older practitioners. The use of non-cohesive gold, as employed by the older practitioners, may now be considered as a lost art in dentistry.

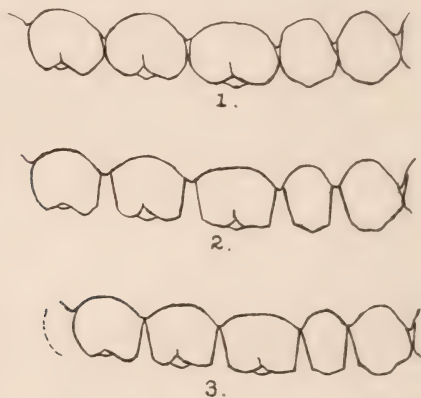


Fig. 3. Diagrams to illustrate method of filing proximal surfaces when non-cohesive gold was used for filling proximo-occlusal cavities. No. 1 shows buccal view of teeth with normal contour. No. 2 shows same view after fillings had been placed and finished with wedged shaped file. No. 3 shows same teeth after they have moved forward until they are in contact near gingival line.

It is interesting to note in a book by James Robinson, published in 1846, a reference to the use of rubber for separating the teeth, so that access might be had for filling simple proximal cavities. I quote the following:

"Where it is necessary to stop the front teeth in young persons, it is best to separate them by means of a thin piece of Indian rubber, stretched to the utmost, in which state it is inserted between them, and allowed to collapse. By renewing this every second day for a week, it will be found that ample space is gained to enable the operator to stop the teeth without difficulty. After the operation is performed, the teeth will in a few hours return to the natural position, without having sustained the slightest injury."—Surgical, Medical and Mechanical Treatment of the Teeth. 1846.

This is the first reference I have found to the practice of separating the teeth, other than the separation gained by the use of the file. This plan was used for proximal fillings in the front teeth and was apparently not employed for the back teeth. It is probable that most proximal decays in the bicusps and molars were not treated until after the occlusal enamel had been undermined, requiring the use of the file.

The process of preparing sponge gold is reported to have been discovered previous to October, 1846, as per the following paragraph:

"In October, 1846, Dr. C. T. Jackson, of Boston, had a tooth filled with sponge gold, of the manufacture of which he had previously discovered the process. This was the first use of this form of gold for the purpose named. It attracted, however, very little attention from the profession until 1853, when Mr. A. J. Watt, of Utica, New York, and Mr. Joseph Barling, Maidstone, Kent, England, appeared (with it) in the field almost at the same time."—History of Dental and Oral Science in America.

It is of interest to note that this gold was placed on the market in 1853 and that there has been a practically continuous effort ever since on the part of the manufacturers to induce the profession to substitute this form of gold for gold foil. I imagine most members of the profession have tried it, but I believe it has never been regularly used for any considerable length of time by more than a very small percentage of operators.

Dr. Robert Arthur discovered the cohesive property of gold foil in 1855, although its importance was not realized at the time. The following paragraph is quoted from Dr. Arthur's first writing on the subject:

"In making some experiments for the purpose of testing the relative solidity, when condensed in a cavity, of gold foil and sponge gold, I found the foil may be made to work in precisely the same way as the sponge gold, and as perfect adhesion obtained between the different portions of gold put into a cavity as with this material. Nothing more is necessary than to cut the sheets of the ordinary numbers of foil into two or three pieces, roll up very loosely, and hold it in the flame of a spirit lamp until it reaches a red heat. It will at once be found to have become so adhesive that, with small and sharply serrated instruments, it may be made to adhere as readily as the best specimens of sponge gold."—Dental News Letter, vol. 8, 1854-5, p. 131.

In this first announcement of it, Dr. Arthur stated that he doubted whether or not the profession would make much use of it. The building out of contours was made possible by this discovery, but the plan of filing V-shaped spaces had become so fixed, that for years afterward the fillings of cohesive gold

were finished in the same form with the same files as had been used for the non-cohesive.

An important step in advancing the use of cohesive foil was the suggestion by Dr. S. C. Barnum, of New York, in 1864, of the use of rubber dam to keep the field of operation dry. The following paragraph is quoted from an article written by Dr. J. S. Latimer:

"Barnum's Rubber Dam is the name of a simple device for preventing the intrusion of blood or saliva during the operation of filling. A piece of rubber tissue or bandage-cloth, as large as one's hand, perhaps, is pierced with a small, round hole. The elasticity of the rubber permits it to be pressed over the tooth; or as an Emeraldler would say, the tooth is thrust through the hole, and, by its contraction about the neck of the tooth, prevents the entrance of fluids. No napkin is required where this can be used. The suggester of this simple device is Dr. Barnum, of the city of New York."—*Dental Cosmos*, vol. 6, 1864-5, p. 13.

This was the one thing necessary to make possible satisfactory operations with cohesive foil, yet the profession was very slow to take up these new methods, because they required different instruments and different technic, also because the real value of the restoration of tooth form for the protection of healthy investing tissues was not appreciated. In fact the soft tissues seem to have received little consideration.

Previous to the time of the use of the rubber dam, it was a very common practice to drive a heavy wooden wedge between the necks of the teeth for the double purpose of gaining separation for access, and of keeping the cavity dry. The interproximal gum septum was often entirely destroyed, and a considerable part of the peridental membrane was too frequently torn from the cementum.

We find a very complete explanation of the welding property of gold in an article by Dr. G. V. Black before the Illinois State Dental Society in 1869, from which I quote one paragraph:

"The welding of pure gold foil is prevented by the gases being condensed on its surface, thereby preventing intimate contact; the direct effect of annealing is to drive off such gases, and render the surfaces clean. To prove this, take a rope of gold foil, anneal it in a bath of dry carbonic acid gas for an hour or more; upon trial its cohesiveness is gone, you may put as much force upon it as you like, it will not weld, but is perhaps much softer than before annealing; bring this piece again under the influence of the ordinary annealing heat and the property returns at once and as perfectly as before."—*Missouri Dental Journal*, vol. 1, 1869, p. 283.

This appears to have been one of the very few papers ever written on this subject. It was the first paper read by this

author before a dental society. It covered the subject completely, was apparently accepted by the profession, and there has been little discussion of the question since.

It required years of study by the most careful observers to develop plans by which it was possible to restore proper contacts with cohesive gold. In filling operations, the only thought seems to have been to cut a cavity of such form that a filling could be put in it, without regard for the shape of the tooth when the operation was completed. The relationship between tooth form and the health of the gingivae was recognized by few men. There were very few who knew much of the exact forms of the teeth, or had any appreciation of what might be accomplished.

During these years little advance had been made in cavity preparation and no definite rules had been laid down for the



Fig. 4. The Perry separator, applied between the upper first and second bicuspid. This appliance not only gives the required separation at the same sitting at which the filling is placed (except in cases where the teeth have dropped together), but forces the tooth to be filled hard against the next tooth, so that it is exceptionally well braced to withstand the force of heavy malleting without discomfort to the patient. As shown in the illustration, pieces of base-plate gutta-percha placed under the bows (on the occlusal of the first molar and the incisal of the cuspid) prevent the separator from slipping rootwise and injuring the gum.

scientific manipulation of gold foil. Although thin foils had generally been used previously, in the early 70's, there was a strong tendency to use very heavy foil, number 30, 60, and even 120 being commonly recommended. An article by Dr. George H. Cushing before the Illinois State Dental Society in 1870 was devoted to this subject, and is typical of many of that period. The following paragraph is from Dr. Cushing's paper:

"The tendency for many years past has been toward lower numbers, that is, to lighter foils; till No. 2, or that which contained but two grains to the sheet, was considered by many as the only foil which should be used by those desiring to secure the very best results. Now, when we

come to the proposition, at once and with no intermediate steps, that No. 60, or foil weighing sixty grains to the sheet, is the best under most circumstances, and in fact the only style of foil which can produce first-class results, we can realize something of the magnitude of the revolution we are about to discuss."—Proceedings Illinois State Dental Society, 1870, p. 61.

After a few years most men dropped back to the lighter weights and the number four has, I think, been most generally used up to the present time.

A plan of separating the teeth without injury to the soft tissues was a requisite to the building of proper contacts, and much credit is due Dr. S. G. Perry, of New York, for his invention of the Perry separator in 1885. This was for many years the only separator on the market which might be used without injury to the soft tissues. The following is quoted from an article by Dr. Perry:

"As a further slight aid to the restoration of contour I have devised an appliance, by means of which the molars and bicuspid may be screwed apart and firmly held while the fillings are being inserted and finished. I have also devised a set of metal wedges by which, in large cavities, the rubber dam may be carried above the cervical wall and held without disturbing the festoons of the gums, as must be the case with wedges of wood or the ligature."—Dental Cosmos, vol. 21, 1879, p. 253.



Fig. 5. Reproduction of illustration showing preparation of a proximo-occlusal cavity in G. V. Black's articles on cavity preparation in 1891. Dental Cosmos, Vol. 33, 1891, p. 98.

Articles on cavity preparation were almost entirely wanting in the literature previous to 1870 and very few appeared during the succeeding twenty years. The articles by Dr. G. V. Black in the Dental Cosmos in 1891 were the beginning of a discussion, which has been practically continuous up to the present time, of the subjects of cavity preparation and the technic of manipulating the various filling materials. From the time of Dr. Arthur's discovery of the cohesive property of gold foil, about forty years (1885 to 1895) were required before all of the problems necessary to its proper use were fully worked out and placed at the disposal of the profession. During the succeeding twenty years, from 1895 up to the present time, there has hardly

been a journal published, or a dental meeting held, without some space or time devoted to this subject, and today we find most members of the profession well acquainted with the principal facts, but still much in need of close study of the finer details.

It is not within the scope of this paper to discuss the details of technic. It can only be said that the operator who will have a good measure of success, and who will really enjoy using gold foil, must have accurate knowledge and be master of the technic of cavity preparation and of the manipulation of this material. The basis for success is proper cavity preparation. This is also the basis of easy manipulation, for practically all properly prepared cavities are easy to fill with gold foil.

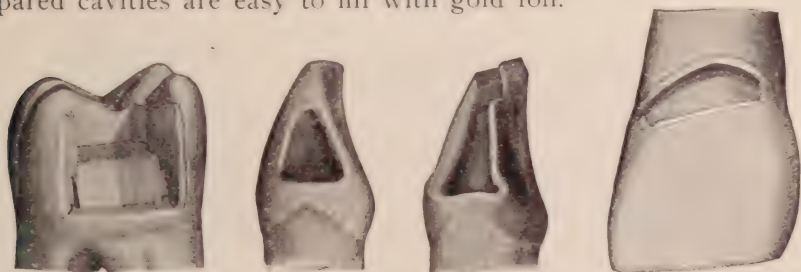


Fig. 6. Modern cavity preparations. Such cavities make the placing of gold fillings very simple and easy, as compared with former preparations. Illustrations reproduced from Black's Operative Dentistry.

The operator who will prepare and fill cavities with the least discomfort to his patients and with the least wear upon himself is the one who trains himself to definite system in all of the technical procedures involved. For each operation he should have in mind at the outset so clear a view of the various steps that he could lay out in the order in which they should be used every instrument and appliance from the beginning of the cavity preparation to the finishing of the filling.

Gold foil possesses in the highest degree those qualities most essential to a permanent filling. These are (1) adaptation to cavity walls, (2) freedom from shrinkage or expansion, (3) indestructibility in the fluids of the mouth, (4) resistance to the stress of mastication.

In the matter of adaptation to cavity walls no other filling material can compare with gold foil. The fact that the gold may be added piece by piece, enables the operator, by following a definite plan of laying on and malleting, to take advantage of the

elasticity of the dentin and actually force the walls of the dentin back in such a way that they maintain a constant grasp on the filling. It is impossible to get the same result with amalgam, which ranks next to gold in respect to adaptation, because the pressure applied is spent in the entire mass of the filling while it is in the plastic state. Even though pressure is maintained until the mass has partially set, the best we can expect to do is to hold the mass in close adaptation to the walls of the cavity. Sufficient force can not be applied to enable the operator to take advantage of the elasticity of the dentin.

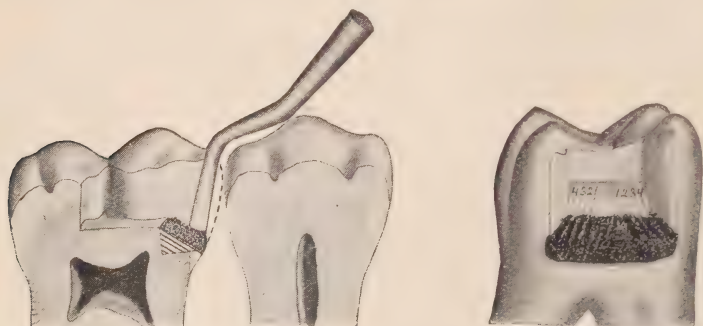


Fig. 7. This illustration is reproduced to impress the importance of the direction of force in securing adaptation of gold foil to the cavity wall. A binangle plugger is used to get proper adaptation to the gingival wall of this mesio-occlusal cavity. The direction of force is in the line of the handle of the plugger, at about 45° to the gingival wall. If a straight plugger is used in this position, it must usually be held nearly perpendicular to the gingival wall, and with such a direction of force, it is impossible to get good adaptation. Illustration from Black's Operative Dentistry.

Fig. 8. This illustration is reproduced to show the proper plan of "stepping the plugger" in building against walls of cavities. Each new piece of gold placed in the cavity, with one edge against either the buccal or lingual wall, is condensed as indicated by the numbers in the illustration. A row of blows is first struck along line marked 1, another row along line 2, and so on, striking the last row of blows along the buccal or lingual wall. This last row of blows will wedge the gold in between that just previously condensed and the wall itself. This is what is known as the "wedging principle" in packing gold, and by this plan gold may be adapted to walls with a direction of force nearly parallel to the wall. Illustration from Black's Operative Dentistry.

The all important thing for the dentist to remember in securing proper adaptation of gold foil to the cavity wall is the direction in which the force is applied. The angle of about 12 centigrades, or 45° , is best. Adaptation is practically impossible if the direction is at a right angle to the wall. Good adaptation may be secured, however, with the direction at considerably less than 45 degrees, particularly if one follows a proper plan of stepping the plugger.

Gold foil answers fully the requirement regarding indestructibility in the fluids of the mouth, as it does also the require-

ment that a permanent filling must be free from shrinkage or expansion.

No other material and no other form of gold is equal to properly malleted gold foil in hardness. In this connection we must recognize the fact that the specific gravity of a mass of gold is an indication of its density, but not of its hardness. Two masses of gold of equal specific gravity may show great difference in hardness. The malleling of pure gold develops hardness, and malleted fillings will therefore better resist the stress of mastication. In order to establish this fact clearly I have made a series of experiments to determine the relative hardness of malleted foil, of cast pure gold, and of certain alloys.

The fillings were made in cavities $\frac{1}{8} \times \frac{1}{8} \times \frac{3}{16}$ inches, cut in the side and end of ivory blocks. These cavities were therefore open on two sides. The fillings were finished even with the surfaces of the block, and were afterwards removed by cutting the block away on one side. Wax models for the castings were made in similar cavities. All castings were made in a Taggart machine at the pressures mentioned. Two different investment materials were used and some castings were made while the investment was hot, others after it had cooled, without any marked differences in results. Each casting was subjected to about the same amount of smoothing, the piece of gold being held in the fingers and no considerable amount of heat was generated.

The specific gravity of each gold filling and each 24 karat casting was carefully determined. For this purpose an accurate balance, registering to three decimal places was employed. Distilled water was used at room temperature of 74° F.

After the specific gravities had been taken, each filling was placed in a combined dynamometer and micrometer for the purpose of measuring the shortening which would occur under stress. The pressure was applied in the line of the longest axis of the gold block. This machine is so constructed that the length of the block is first accurately measured in ten-thousandths of an inch, and as the stress is applied, a hand on the dynamometer dial indicates the amount of force, while a hand on the micrometer dial indicates the amount that the block is shortened.

In this series of experiments 350 lbs. pressure was gradually applied to each block, and the lengths before and after were

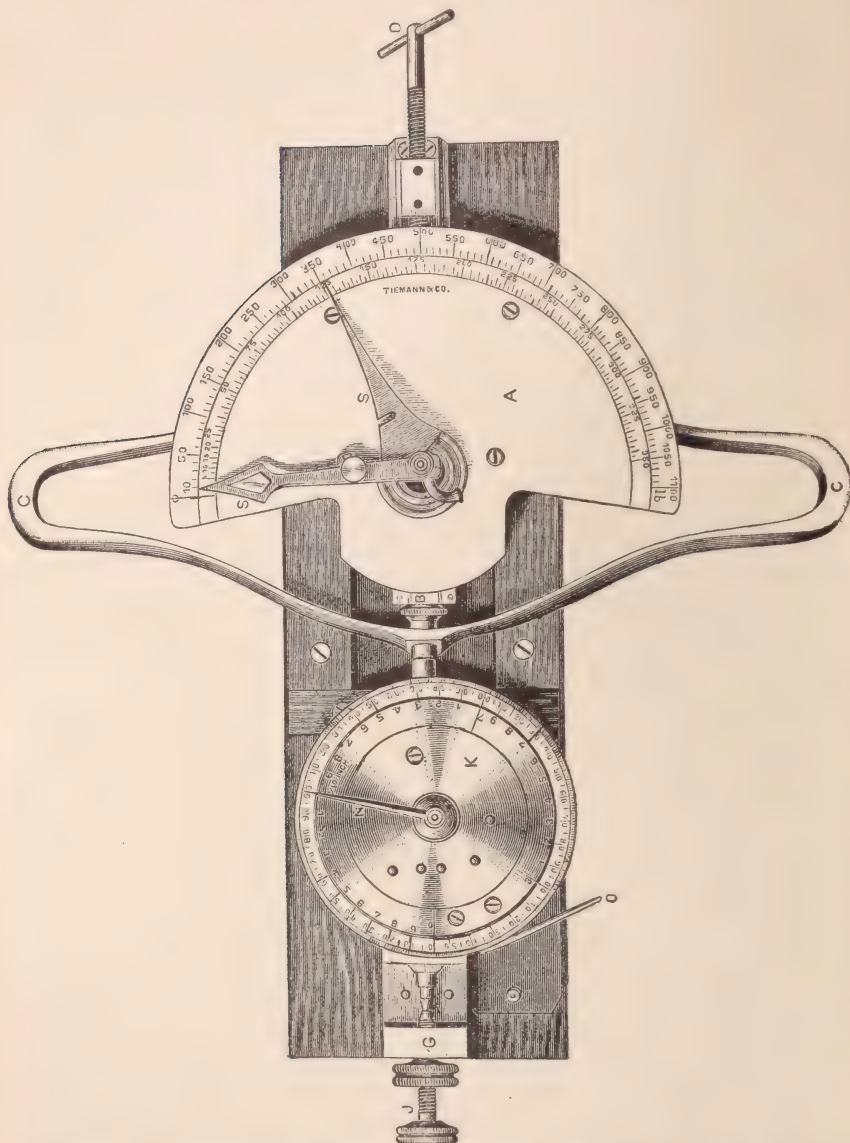


Fig. 9. Dynamometer with micrometer attachment. The block of gold, or other substance to be tested is placed between the end of the screw J (which passes through G) and the shaft which passes under the small dial. Space is made for the block between these ends by moving the lever O. The hand on the small dial indicates the length of the block before pressure is applied. The screw D is then turned, compressing the spring C C, and the amount of pressure is recorded by the hand on the large dial. As the pressure is increased, the shortening of the block is indicated by the movement of the hand on the small dial. The difference between the first reading of the small dial and the reading after a certain pressure has been applied, will be the amount of shortening. From these figures the percentage of shortening may be determined.

noted. From these measurements the percentage of shortening was determined. In the following table the averages only are given, as the variations from these figures were not material, and this simple tabulation gives a clear statement of the results.

TABLE SHOWING PERCENTAGE OF SHORTENING UNDER 350 POUNDS STRESS OF SEVERAL FORMS OF PURE AND ALLOYED GOLD.

	Average Sp. Gr.	Average percent. shortening under 350 lbs. stress	Average for each group
Malleted—			
24K, Foil.....	17.86	1.9	1.9
Cast—			
24K, 5 lbs. pressure.....	19.05	14.6	
24K, 10 lbs. pressure.....	18.65	15.8	
24K, 15 lbs. pressure.....	18.8	16.15	15.5
22K, 5 lbs. pressure.....		5.85	
22K, 10 lbs. pressure.....		5.50	
22K, 15 lbs. pressure.....		5.96	5.77
Gold, 5% platinum, 5 lbs. pressure.....		10.75	
Gold, 5% platinum, 10 lbs. pressure.....		12.3	
Gold, 5% platinum, 15 lbs. pressure.....		9.35	10.8
Gold, 10% platinum, 5 lbs. pressure.....		9.01	
Gold, 10% platinum, 10 lbs. pressure.....		11.05	
Gold, 10% platinum, 15 lbs. pressure.....		10.4	10.2

It will be noted that the blocks of cast pure gold with average specific gravities of 19.05, 18.65, and 18.8—an average of 18.83 for all of these—were shortened an average of 15.5% while the blocks of malleted gold with an average specific gravity of 17.86—practically one full point lower specific gravity than that of the cast blocks—were shortened only 1.9%. The cast blocks, while of greater density, were so much softer that they were compressed eight times as much as the malleted gold. This not only demonstrated positively the advantage of the hardness secured by malleting, in resisting the stress of mastication, but also fully establishes the fact that cast pure gold is not a proper material to use in positions where the stress of mastication must be withstood.

It will be noticed that gold containing either 5% or 10% of platinum shows about five times as much shortening as malleted foil, and 22K gold about three times as much.

The criticism might be made that 350 pounds is greater stress than would be brought upon fillings in the mouth. It is really immaterial how much stress is applied, the percentage of shortening is practically the same. In turning the screw which compresses the dynamometer spring, the shortening of the block

was in several instances noted at $87\frac{1}{2}$, 175, $262\frac{1}{2}$ and 350 pounds, and the shortening was practically in proportion to the stress. Therefore, the percentage of shortening would be the same if a pressure of 100 pounds, or of 200 pounds, had been used.

In order to make a really dependable gold foil filling certain things are necessary, and may be summarized as follows: (1) The cavity must be properly prepared. This includes not only the outline form which may be best in relation to conditions of environment, but the form must be such as to permit good access, good retention and sufficient resistance to the stress of mastication. (2) The field of operation must be kept thoroughly dry. (3) For all proximal cavities sufficient separation must be obtained to permit of a proper finishing with contact restoration. (4) The direction of force must be such as to insure proper adaptation to the cavity walls. (5) The force used must be sufficient to give a specific gravity above 16 in positions where the stress of mastication must be withstood. In this connection, emphasis should be laid on the fact that, while well malleted fillings are much harder than castings, fillings which are not so malleted are liable to be even softer than the castings.

When is the gold foil filling indicated? That is a question which each operator must answer for himself. We may lay down certain general rules, and mention certain exceptions. In the opinion of the writer a properly made gold foil filling is enough better than any other, that it should be the standard operation for every dentist. I do not mean by this statement that all cavities should be so filled, but that other methods should be employed according to the indications in the particular case. To state my view more definitely I should say that gold foil is best to use as a general rule in all pit and fissure cavities, in all gingival third cavities in buccal and labial surfaces in which the decay in the dentin has not undermined the enamel to any considerable extent, and in all proximal cavities in which a similar undermining of the enamel had not occurred. Cavities in which lateral decay in the dentin has not undermined the enamel are never very large cavities. Exceptions to this general rule would be made in cases in which the condition of the periodontal membrane, difficult access, or cosmetic requirements would contraindicate the use of gold foil.

Under the above rule gold foil would be used in practically all small and medium sized cavities, except in those cases in which amalgam might be substituted in the back teeth on account of the difference in expense, or difficult access.

For each operator it is not always a question of what might be the best operation to perform, but rather which operation is best for the individual operator to undertake in the particular case, all conditions and circumstances being considered. An operator's recognition of his own ability in carrying out the technic of the various methods should materially influence his decision. Some seem to easily master the technic of one plan, and are always in trouble with another. They should, by persistent and determined effort, master the technic of the method in which they are not proficient or else it should be used little, no matter which it is.

I feel that I can not give a better idea of my own views than to present a tabulation of the last one thousand metallic fillings which I placed, previous to October 13th. It will be noted that this includes gold foil fillings, gold inlays and amalgam fillings, in various locations, with the numbers of each.

CLASSIFICATION OF 1,000 GOLD FOIL FILLINGS, GOLD INLAYS AND
AMALGAM FILLINGS.

	Gold Foil	Gold Inlay	Amalgam	Totals
Incisors and Cuspids—				
Incisal	13	0	0	13
Proximal	136	6	0	142
Gingival Third	33	0	0	33
	<hr/> 182	<hr/> 6	<hr/> 0	<hr/> 188
Bicuspid—				
Occlusal	12	0	0	12
Mesio-occlusal	44	3	15	62
Disto-occlusal	64	6	39	109
Mesio-disto-occlusal	6	44	16	66
Gingival Third	21	0	4	25
	<hr/> 147	<hr/> 53	<hr/> 74	<hr/> 274
Molars—				
Occlusal	52	2	53	107
Mesio-occlusal	85	19	92	196
Disto-occlusal	17	22	57	96
Mesio-disto-occlusal	0	68	18	86
Gingival Third	23	0	30	53
	<hr/> 177	<hr/> 111	<hr/> 250	<hr/> 538
Totals	<hr/> 506	<hr/> 170	<hr/> 324	<hr/> 1,000
Percentages	50.6	17	32.4	

In the foregoing table, each mesio-disto-occlusal filling, or inlay, is counted as two, in order to give a fair comparison with the other fillings. There were really but three mesio-disto-occlusal gold fillings in bicuspid, but they are entered as six; or what may be considered six cavities were filled by them. About fifty fillings, consisting of fillings placed to build out contacts, repair of previous fillings, etc. are omitted from the table.

It will be noted that I have used gold foil almost exclusively for metallic fillings placed in incisors. Although porcelain inlays and synthetic cement fillings are not included in this tabulation, their number is small. In the bicuspid, and molars, gold foil has been used exclusively for simple occlusal fillings reported in this tabulation. About two-thirds of the mesio-occlusal and disto-occlusal fillings in bicuspid have been of gold foil, and about one-third amalgam, with a very few inlays, while the mesio-disto-occlusal fillings in these teeth have been two-thirds gold inlays and about one-third amalgam, with very few gold foil fillings. The gingival third fillings in the bicuspid are almost all of gold foil.

In occlusal cavities in the molars gold foil and amalgam have each been used for practically half of the operations. In mesio-occlusal and disto-occlusal cavities, about one-third of the operations have been gold foil, one-sixth gold inlays and one-half amalgam. No mesio-disto-occlusal foil fillings have been made. About four-fifths of these have been gold inlay operations, and about one-fifth amalgam. The gingival third fillings in the molars have been fairly divided between gold foil and amalgam, with no inlays.

For all metallic filling operations, practically one-half are gold foil, one-sixth gold inlays, and one-third amalgam.

This is a problem which each man must work out for himself. Every dentist should bring himself to the highest possible point of efficiency in the technic of each of the various methods and should employ each according to his ability and the conditions presenting. We should all study and recognize the merit which there is in each plan and should endeavor to do our best with each.

In the opinion of the writer, the gold foil filling stands today as the standard procedure as a filling operation, possessing

in the highest degree the qualities most necessary to permanent operations. The technic is a little more exacting, but this should only be an incentive to all those who enjoy their work to become thorough masters of it. The operator who is proficient in the manipulation of gold foil, can hardly fail to do the highest type of service with the gold inlay and with amalgam.

ASSISTING NATURE TO REGULATE TEETH IN ADULT LIFE.*

BY DR. L. C. BRYAN (LEYSIN).

Where the teeth are of normal size and the jaw of normal size, serious irregularities of the teeth are exceptions.

Abnormal crowded conditions or previous indiscriminate extraction cause irregularities in a large percentage of our cases. Let us consider these large classes and leave the others to the orthodontist. We can not all be orthodontists, and keep suffering humanity dentally comfortable and "salonfähig" as the Germans would say.

We can all watch our young patients and guide the twig as the tree should grow. Few of us think of regulating the teeth in adult life and nothing is easier or more gratifying to both operator and patient.

Grinding teeth for space or to assist nature in adult life is a very simple and justifiable operation and cannot lead to decay or bad results in such cleanly patients as we are called upon to treat daily. In mature life, abrasion by attrition or by carborundum wheels is almost synonymous. Ground or abraded surfaces in contact and subject to attrition, thus being kept normally clean, do not decay.

We do not have grave irregularities of teeth if normal space is at hand for the cheek, lips and tongue to bring their subtle but irresistible influence to work to form a beautiful and regular arch, under normal conditions of heritage and environment.

We are often called upon to treat new adult patients for some disturbing lesion. The inspection is made with the mouth

*Read before the American Dental Society of Europe.

opened and the dental organs far from their normal juxtaposition. How many of us consider what relation that denture above should or does bear to the one below? How many of us consider the relations each individual tooth bears to its antagonist? We do what is asked of us and dismiss the patient. Have we done our duty by that patient? The patient came with pain. We have relieved it. The patient is satisfied. Should we as an anesthetic dentist be? Have we studied the case in the interests of the patient? Have we discovered in the wide open oral cavity as we are shown it, the interlocking teeth, the malarticulated molars, the teeth that are doing half duty owing to the mistakes of early treatment and have passed through the hands of able men who only looked for the cause of the disease which brought the patient to them, or for the cavities in the teeth?

Have we conscientiously studied the denture as a whole, with the teeth in their normal or masticatory position? Generally not. We were not asked to and we consider we have done our duty by new adult patients when we have relieved them of their inconvenience which brought them to us. How many of us study the relations of the two maxilla to each other and the function of mastication in the teeth? Even with the two dentures in normal position, few of us can judge of their relations and their efficiency without a model of each properly articulated, with opportunity to view that articulation from the lingual side as well as the buccal and labial which latter is usually our point of view even with the jaws in situ.

In Basel I made it a practice for a quarter of a century to take full upper and lower models of all my patients and preserved them for ready reference and study. Models in the possession of the dentist are a bond of union between him and the patient; and patients often refer to these models and are pleased to have occasion to take them with them for personal study and return them to the dentist.

The fact that the most important cause of pyorrhea alveolaris is irregularity of the teeth or malocclusion, makes it our greatest duty to recognize and correct the slightest irregularity in any or all of the teeth. The fact that 90% of human dentures have irregularities that slight grinding, or some other assistance

that we as dentists can give to nature to right the wrong, would correct or improve the case, makes it an imperative duty to look most carefully for these irregularities. With the most thorough examination of the teeth we are unable to discover 50% of those which we could detect did we but make models of each and every new patient and give these models (which require only a few minutes to take) careful attention and study.

Even the most experienced dentist after examining a denture for irregularities of occlusion and correcting them will discover others on models in *almost every case* as has been my experience.

The fact that Prof. Gysi of Zurich neither in his own practice in Zurich nor with the help of all his friends in Switzerland in their practices, could find a single perfect articulated set of natural teeth and that he finally had to advertise and offer a reward for such a case fully bears out the statement that we will find malocclusions and irregularities practically in every case that comes under our care if we take models and study them.

The correction of these can almost invariably be done by assisting nature in some simple way without fixture and without pain.

How many unsuspected irregularities have I thus discovered which could be remedied by some simple and well-known operation, generally grinding, making the denture more efficient where it had been deficient?

Interlocking cuspids and single rooted teeth were brought into normal position in a few minutes by injection of cocain and immediate regulation in cases from early youth to mature age as has been demonstrated before this society in years gone by, and as I hope to demonstrate at this meeting again.

Molars which had gone astray in the matter of malarticulation, principally the so-called wisdom teeth that had taken an unwise course owing to abnormal circumstances in the denture—usually overcrowding—or heavy blocks of gum tissue through which the tooth must erupt, remaining on one surface and throwing the large crown with its small conical root to one side or the other; and had thus missed articulating with their natural antagonists and had grown out of line, were ground

once or annually until they assumed their normal position simply with the assistance of the tongue and cheek which will invariably regulate misguided teeth if favorable conditions are provided by the dentist's carborundum wheels or other available means, or abnormal masses of gum tissue are removed with the gum lance or rotary cup lance in engine.

We can assist nature in many ways if we study the cases and have aims above simply filling and cleaning teeth and relieving pain. In this we must have the confidence of patients; we must make models of the cases and show them to our patients and let them see the defects of articulation and what we can do for them. New patients whose confidence we have not secured will sometimes make objections to "grinding off the enamel," as they say, to correct irregularities or improve other defective conditions, but a confident word from their dentist and his models of cases improved or corrected will invariably secure the confidence of the patient.

There are those still living who have been the victims of the rage for grinding ushered in by Arthur for preventing or curing decay and carried to extremes by his disciples, but a new generation is in our hands confident in our advancing science and art who are ready to submit to cautious and scientific treatment even with Arthur discs, but even more confidence in our thin diamond and thinner steel discs recently introduced and unknown to Arthur.

The present generation of dentists, with knowledge of the evils of an overenthusiasm for Arthur's methods of treatment to prevent caries, can still use the disc or the wheel with intelligence and efficiency in the treatment of irregularities in adult life. I recently had a case, models of which I will demonstrate at the clinic table, whose 4 third molars had missed articulation and passed each other so that they were absolutely useless. I suggested a slight "operation" of grinding. The patient immediately got frightened at the word "operation." I simply dropped further discussion of the matter. But while filling and treating the other teeth I gave an occasional grind on the points of these four teeth which needed the "operation" and presto! before her other treatments were complete I was able to show

her on models that those teeth had already assumed a better position and bid fair to be useful teeth for life!

Lower crowded incisors—our most numerous class of irregularities in adult life—are the most grateful class of cases to treat and with the least chance of evil (decay) resulting from grinding them proximally for space to allow the tongue and lips to do the subsequent regulation desired. The incisor teeth in cleanly patients can be ground laterally even to the removal of most of the enamel, which is seldom necessary, owing to their being the last teeth of the denture to decay from extraneous surroundings. Their slight contact proximally and the constant bath received from the sublingual glands make them eminently immune to proximal caries.

Seldom is a new case of adult dentures presented to us where a slight or extensive well considered grinding of mal-articulating surfaces or cusps of molars or bicuspidis will not improve the articulation and the efficiency of the whole denture. But most cases should be studied on the articulated models at leisure and in the mouth after each move or change. Grinding indiscriminately cannot be too severely condemned and constant thought and care must be exercised not to grind without being absolutely sure of the final result of each grinding from a careful study of the general plan decided on and reconsidered after each and every application of the wheel or disc!

General rules cannot be formulated for regulating nor as to steps to take to assist the tongue, cheeks and lips in regulating teeth, but each case will suggest its remedy and in general only space is needed, or a cusp needing reduction or removal, or a depression made to accommodate an articulating cusp.

This force of the tissues surrounding the teeth and which regulates them whenever space is provided and no interlocking of antagonist cusps or cutting edges prevents the teeth from assuming their normal position, is a power that is not generally recognized in orthodontia, but is always present even in adult life. This we must recognize and remember. It works almost invariably for the correction of irregularities except in cases where the crowns of teeth have been displaced before the root has developed fully or where there is an inherited irregularity. A malformed root will always tend to throw the crown back

into its abnormal position even after regulating with appliances and retaining for long periods. Here wire retainers should be applied and left.

Where two cusps of antagonising molars prevent their full surfaces from properly articulating, one or the other should be ground down to such an extent that a depression is formed, or all points of the two teeth equally separated from one another. Nature's forces will quickly bring these two teeth into articulation by raising or lowering one or both, so that they will speedily articulate again and become of enhanced value in mastication. Teeth always grow up or down, even in adult life, seeking an antagonist and elongate with their surrounding tissues of alveolus and "grow" till they find it.

Particularly surprising results can be secured in molars and bi-cuspid which by some accident in development have entirely passed each other's grinding surfaces and only articulate on their sides as we often see in the case of the third molars. I will present models of several cases where third molars had entirely missed each other in development. Two cases are for gentlemen over 50 when treated. The only treatment undertaken was to grind two inclined planes on the approximating surfaces of the two teeth and leaving nature to do the work of pushing them into place. These teeth with their conical and often amalgamated roots and large crowns are particularly favorable cases for the soft tissues of the oral cavity to force into line and their proper place when assisted by grinding. One is even justified in devitalizing one of these teeth if badly decayed to allow of free grinding where the tooth becomes too sensitive to do the necessary abrasion with the wheel.

One case presented—of a dentist friend—was some years in coming entirely into line owing to the usual sensitiveness of dentist's teeth preventing grinding being properly carried out.

Another case where a lower third molar stood inside the arch with the masticating surface towards the tongue at an angle of 60 degrees and the upper molar striking it on the buccal side has righted itself and articulates almost normally within a year owing to its having its exposed pulp removed for relief of pain, thus permitting of free grinding.

A remarkable coincidence in connection with the irregu-

larity and interlocking of third molars and cuspids is that almost all those cases treated, have been on the right side.

Another class of irregularities in adult life which we should consider and treat is that which we often see, of teeth "spreading apart," making for the most of us unaccountable spaces between the teeth, especially unsightly spaces between the incisors. In these cases the surrounding tissues may seem to the casual observer almost perfectly normal and no explanation of this erratic movement be observed. Let us press on these tissues some hours after a meal or, if possible, some hours after the dental toilet of brushing the teeth which most patients indulge in to excess before visiting the dentist, and we will almost invariably be able to press out a slight drop of pus! Let us probe between such estranged teeth and we will usually find a pyorrhoea pocket! The slight and almost imperceptible inflammation in this pocket has caused those teeth to "wander" or be pushed apart by the slight swelling of the gum tissue and a removal of the pathological condition will restore them to their normal position, if drawn together with ligatures and held there.

Recently I had a case of a lady of 40 odd whose lower maxilla was protruding so that the lower incisors articulated outside, or anterior to, the upper incisors and the molars and bicuspid not at all correctly. She wished this protrusion corrected. I was nonplussed and applied to a distinguished specialist in orthodontia for advice, but in the meantime proceeded to wedge between the upper incisors and bicuspid to distend the upper arch and grind articulating surfaces which were throwing the inferior maxilla and teeth forward, binding at the same time the lower incisors and bicuspid together with silk ligatures to close up existing spaces and before I had arranged terms for the advice as to treatment and received instructions from my specialist and paid his fee the case was fairly well regulated and normal, grinding and wedging, assisting nature, did it, as no right or wrong Angle appliance could have done it without noticeable pain or inconvenience to the adult patient. See models of this case corrected. These cases, like "the poor," are always with us and many similar ones which only require us to assist nature to correct them easily and painlessly without complicated fixtures.

Owing to my old models not being available since my retirement from practice at Basel I am only able to present isolated cases as models, that I have successfully treated lately, but these will clearly show a few results obtained in a long and arduous life devoted to a desire to assist nature in regulating teeth in adult life. I present these at the clinic table and ask the indulgent criticism of my colleagues among whom I recognize many eminent and scientific orthodontists.

TECHNIC OF CONSTRUCTION FOR COMBINATION GOLD AND CONTINUOUS GUM DENTURE.*

BY DR. J. O. EPPRIGHT (COLOGNE).

The borders of impression should be trimmed square, model and die prepared so that plate may have turned edge. Gold plate about twenty-four millimeters thick is swaged and fit in the mouth assured. Over that portion of this plate which would correspond to the surface to be covered by the rubber in case rubber attachments were to be used, is swaged pure platinum about ten mil. thick. Place this swaged platinum in position on the gold plate, attach with a point or two of wax. Place in the mouth and take bite.

Select diatoric teeth and articulate. For convenience in holding the teeth in position in the baking, after position is assured, a fine platinum wire such as is used for winding the muffle in an electric furnace, is placed through the horizontal holes in the teeth.

Detach the platinum from the gold plate and in about four places on each side drill holes about fifty mil. in diameter through the platinum at points corresponding to the opening on the under side of the diatoric teeth and insert carbon points.

With coarse grained investment material capable of standing a high temperature, invest the platinum and teeth, covering it on palatal and lingual sides, allowing investment to cover the ends of the teeth. After this has thoroughly dried melt out the wax, pack with porcelain body and biscuit as usual. After

*Read before the American Dental Society of Europe.

cooling remove investment, fill out any cracks and give second baking.

The fused piece is now placed in position on the gold plate in order to judge of proper contour and the gum enamel is added and the final bake given, cooled and the carbon points drilled out.

The gold plate is now covered on its alveolar aspect with a thin film of wax, slightly warmed and the porcelain piece pressed into place. On removal the points, where the holes were left by removal of the carbon points, will be revealed in their relative position on the gold plate. At these eight points on the gold plate holes are drilled and gold wires of a size and length to fit the holes in the porcelain, are fitted and soldered.

The porcelain piece is again placed in position on the gold plate and an impression taken for the palatal reinforcement. This is swaged to extend above the plate $1/16$ to $1/8$ -in. as the case may demand and covering entire palatine surface, soldered and entire plate polished.

The porcelain piece is now ready to be attached. Small gateways are cut with a stone under the heels of the porcelain piece and it is placed in its proper position on the gold plate. The turned edge and palatal reinforcement are carefully burnished against the porcelain and the entire case placed in a sand bath, heels up. After heating, small pieces of sulphur are placed on the gateways and melted in until the entire intermediary space is filled.

If repairs are needed at any time, with a sharp instrument turn slightly back the palatal reinforcement, heat the denture slowly until the sulphur melts when the porcelain can be easily removed.

Among the many advantages of this combination plate are less danger of change of form of the plate after it has been fitted to the mouth because the porcelain is baked on an entirely separate piece of metal. Those having had experience in the making of continuous gum dentures will appreciate this obviating the warping which so often occurs in the baking. It is easy to repair and less expensive to construct and, as made from the diatire teeth, is decidedly stronger than the ordinary continuous gum denture.

My own experience with this combination plate has been extremely gratifying and to those accustomed to continuous gum work, I feel certain that once tried, this method of procedure will appeal.

ON THE CLINICAL VALUE OF PROF. SCHRÖDER'S APPLIANCE FOR ELECTRO DENTAL DIAGNOSIS.

BY DR. SHIROKURO ENDO, SOUTH MANCHURIA RAILWAY HOSPITAL,
DAIREN, CHINA.

One of the most subtle and baffling of operations in the routine practice of conservative dentistry is the detection of unhealthy conditions in the dental pulp.

In the generality of cases, the diagnosis of the morbid condition of the pulp is not a difficult one at present, but in special cases, as, for example, when a patient presents himself with a history of severe and long-standing neuralgic disturbance with persistent floating pains which seem to be located anywhere from the lip to the middle ear, under a tooth with a gold crown or the tooth with any filling, it is hard to find the real cause and to diagnose it properly, even if we undertake the most detailed examination possible.

In such a case, the following tests are generally recommended:

1. The percussion for soreness.
2. Inspection, palpation, and odor.
3. Walkhoff's thermometer diagnosis.
4. Preiswerk's chemical diagnosis with formalin.
5. Transillumination.
6. Electro-diagnosis.

It is not my intention to discuss the first five methods of diagnosis in this paper. We will concern ourselves with the sixth method, or electro-diagnosis. It is a well known fact that the human dental pulp responds to electrical stimulation whether it is in a normal or pathological condition, but that there occurs no response after the pulp has completely been destroyed by disease.

The electro-dental method of diagnosis consists in the investigation of the state of the dental pulp by utilizing the above fact.

This diagnostic measure has been known and practiced by practitioners such as Dr. W. G. C. Fuyt of Amsterdam, Dr. John E. Grevers of Amsterdam, Drs. Underwood, Hafner, Frohman, Tousey and Prof. Schröder for about seventeen years,—some as Dr. Hafner employing the galvanic current of an induction coil.

Consequently the mechanical constructions of these apparatus are varied and numerous. In principle, however, they are all the same. The apparent value of this method has greatly risen in esteem and its reputation has been much enhanced since Prof. Schröder published an excellent essay on this subject. (*Deutsche Zahn Heilkunde in Vortrager* 1907. Heft 2, and *Correspondenz Blatt für Zahn Arzt*, 1905. Heft 1.)

Prof. Schröder's induction apparatus is generally admitted in Europe, America and Japan to be the most valuable one of its kind.

When, however, we investigate this in detail we find it is not so ideal as generally supposed—both from an electrical and a clinical point of view.

I wish in this article to state my own personal clinical experiences with this appliances for over two years. I shall treat this subject under the following two headings:

1. The apparatus as an aid in determining the condition, pathological or otherwise, of dental pulp.
2. The effect on the reaction of such conditions as hunger, morphine, narcosis, weather and the employment of dry or liquid cells—or the secondary battery.

Dr. Daisuke Nakagawa, a colleague of mine in the Dairen Hospital, who also is specially interested in electro-dental diagnosis, is now investigating this phase of the subject and intends to publish the results of his research in due course. I shall, therefore, simply at present first describe some typical cases selected from 115 patients adding, if I may be pardoned for so doing, my own personal criticisms.

The following tables will show that the reaction of the dental pulp to the electric current differs with individual patients.

THE EXPLANATION OF THE ABBREVIATIONS TO BE USED IN THIS ARTICLE.

- M. = The male sex.
 F. = The female sex.
 + = Positive reaction.
 ++ = Hyper-positive reaction.
 +++ = Super hyper-positive reaction.
 - = Negative reaction.
 ± = Indeterminate reaction.
1 2
- In the Reaction Column the first figures, indicate the degree of the iron rod which pushed into the cover shield, and the second figures the degree of the scale.
 For instance:
1 2 3.5—Denotes the upper left central incisor, the degree of the iron rod 2, the degree of the scale (or the degree of the secondary induction coil) 3.5, the reaction negative result.

3 4 etc., denotes the kind of the tooth.

For instance:

1 1 denotes upper left central incisor.

3 1 denotes upper right cuspid.

4 4 denotes lower left first premolar.

SERIES OF EXPERIMENTS.

No.	Sex and Age.	Main Symptoms of the Teeth Affected.	Other Dental Symptoms.	Clinical Diagnosis.	Electrical Reaction.	Electrical Diagnosis.	Results.	Notes.
1	48 M.	Percussion \pm Loosening (<u>1</u>) \pm Loosening (<u>2</u>) + Percussion (<u>2</u>) \pm	Nothing wrong with the gum. Reflex, in the region of the left side of the face.	Obscure.	<u>2</u> 0:2.0—0:3.0 \pm <u>1</u> 2:3.5 \pm <u>1</u> 1:0.5—1:0.8 + <u>2</u> 2:0.5—2:0.8 +	<u>2</u> Pulpitis? <u>1</u> Pulp dead?	<u>2</u> Pulp vital. <u>1</u> Dead.	To determine the cause.
2	18 F.	Discolored No loosening Water \pm Hot water \pm	Appearance O. K. No hole.	Obscure.	<u>1</u> 3:5.6—3:5.9 \pm <u>1</u> 1:3.0 + <u>2</u> 1:3.0 + <u>2</u> 1:2.9 + +	<u>1</u> Dead. Pulp gangrene	<u>1</u> Pulp gangrene	
3	35 F.	<u>5</u> <u>6</u> <u>7</u> all of No discolored Loosening + + + Water + Percussion + +	Gum somewhat red. Swelling medium. Fistula in the gum. Pyorrhea alveolaris present.	Obscure.	<u>5</u> 2:3.8 + <u>6</u> 0:4.8 + + <u>7</u> 3:2.0 + After cocaine 1% solution 0.5cc injected. <u>6</u> 3:3.9 —	<u>6</u> Pulpitis?	<u>6</u> Vital.	Complete cure after the extraction of the pulp by means of intra-gingival injection.
4	35 F.	Both of <u>6</u> <u>7</u> No discolored Loosening + + + Water \pm Hot water \pm Percussion + + No filling	Quite the same as above.	Obscure.	<u>6</u> 1:2.0 + + <u>7</u> 3:3.0 \pm 3:3.5 + <u>6</u> 2:7.0 + <u>7</u> 2:5.6 + After cocaine 1% solution 0.5cc injected. <u>6</u> 3:4.0 —	<u>6</u> Pulpitis?	<u>6</u> Vital.	Same as above.

SERIES OF EXPERIMENTS.

Sex and Age	Main Symptoms of the Teeth Affected.	Other Dental Symptoms.	Clinical Diagnosis.	Electrical Reaction.	Electrical Diagnosis.	Results.	Notes.
5 36 F.	<u>4</u> <u>5</u> <u>6</u> <u>7</u> all of			<u>4</u> 3:3.0 +			
	No discolored	Gum atrophied.	Obscure.	<u>5</u> 0:5.0 + +	<u>5</u> <u>6</u> both.	Sub-acute pulpitis.	Complete cure after the pulp extirpated.
	Loosening + +	No swelling.		<u>6</u> 1:1.5 + +	Pulpitis?		
	Water +	Pyorrhea, alveolaris present.		<u>7</u> 3:3.0 +			
6 43 M.	No discolored	Facial neuralgia left side only.		<u>7</u> 2:7.5 + 3:2.0 +			
	Loosening -			<u>8</u> 1:4.5 +			
	Water ±	Gingivitis marginalis totalis.	<u>6</u> Pulpitis?	<u>6</u> 1:5.0 +	Dead!	<u>7</u> Gangrenous pulpitis.	To examine the actual cause.
	Hot water ±	Calculus deposited in excessive quantity.		<u>5</u> 1:2.5 +			
7 38 M.	Percussion -			<u>6</u> 1:5.0 +			
	<u>6</u> Filled with cement			<u>7</u> 1:5.5 +			
	All of <u>4</u> <u>5</u> <u>6</u> <u>7</u>	Gum atrophied (medium).		<u>6</u> 0:4.5 + +	<u>6</u>		
	No discolored			<u>4</u> 2:3.0 +	Pulpitis?	Gangrenous pulpitis.	Complete cure after the extirpation of the pulp.
	Loosening + +	Slight swelling.	Obscure.	<u>5</u> 2:2.0 +			
	Water -	Pyorr. alveo. present.		<u>7</u> 3:1.5 +			
	Percussion +						
	Percussion <u>6</u> + +						
	Poor mastication						

SERIES OF EXPERIMENTS.

Sex No. and Age.	Main Symptoms of the Teeth Affected.	Other Dental Symptoms.	Clinical Diagnosis.	Electrical Reaction.	Electrical Diagnosis.	Results.	Notes.
8 37 F.	$\frac{6}{1} \frac{7}{2} \frac{4}{3}$ No discolor Loosening ++ Water + Hot water ++ Percussion ++ Cannot masticate.	Gum atrophied. No swelling. Pyorr. alveo. pres- ent.	Obscure.	$\frac{6}{1} 0:3.9 +$ $\frac{7}{2} 2:7.0 \pm$ $\frac{4}{3} 2:4.0 \pm$	$\frac{6}{1}$ Pulpitis?	Sub-acute pulpitis.	Complete cure after the extir- pation of the pulp.
9 40 M.	$\frac{1}{1} \frac{2}{2} \frac{3}{3}$ All very loose	The mouth swollen in a medium de- gree, both inter- nally and exter- nally. Fever 39.0c. Impaired appetite. Sleepless for six days. Constipation II.	Acute sub- periosteal abscess.	$\frac{1}{1} 3:9.0 -$ $\frac{2}{2} 0:5.0 +$ $\frac{3}{3} 1:4.5 +$ $\frac{1}{1} 0:5.0 +$ $\frac{2}{2} 0:4.8 +$ $\frac{3}{3} 0:6.2 +$	Dead.	Pulp gangrene (moisture).	To deter- mine the cause.
10 33 F.	$\frac{1}{1} \frac{1}{1} \frac{1}{1}$ Not loose at all Thermal stimuli - Percussion + Somewhat translu- cent	Presence of a fis- tula between the $\frac{1}{1}$ and $\frac{1}{1}$.	Obscure.	$\frac{1}{1} 2:8.0 -$ $\frac{1}{1} 1:4.0 +$ $\frac{2}{2} 0:4.0 +$	$\frac{1}{1}$ Dead.	$\frac{1}{1}$ Dead.	To deter- mine the cause.
11 24 M.	$\frac{1}{1} \frac{1}{2}$ Both loose + No discoloring	Excessive swelling between $\frac{1}{1}$ and $\frac{2}{2}$. Fever 38.8°C. Sleepless for three days. Impaired appetite. Constipation.	Acute peri- ostitis of the supe- rior max- illary bone	$\frac{1}{1} 3:6.0 - 3:6.6 \pm$ $\frac{2}{2} 1:4.5 +$ $\frac{1}{1} 1:1.6 +$ $\frac{2}{2} 1:1.5 +$	$\frac{1}{1}$ Dead.	$\frac{1}{1}$ Dead.	To deter- mine the cause.

SERIES OF EXPERIMENTS.

No. and Age.	Main Symptoms of the Teeth Affected.	Other Dental Symptoms.	Clinical Diagnosis.	Electrical Reaction.	Electrical Diagnosis.	Results.	Notes.
12 28 F.	<u>1</u> <u>1</u> <u>2</u> All very loose No discoloring Appearance good	Excessive swelling Between <u>1</u> <u>1</u> <u>1</u> and <u>2</u> Fever 39.3°C. Sleepless for 5 days. No appetite. Constipation.	Acute peri- ostitis of the super- rior max- illary bone	<u>1</u> 3:5.5— <u>1</u> 2:4.0—2:4.4+ <u>2</u> 0:5.5+	<u>1</u> Dead. <u>1</u> Dead. Somewhat vital (?)	<u>1</u> Dead. <u>1</u> Somewhat vital (?)	To deter- mine the cause.
13 35 M.	<u>16</u> Loosening ± Cold water + Hot water + Percussion + Appearance normal, with a slight me- chanical abrasion.	Gum swelling in a medium. All of teeth are attacked by pyorr. alveo. in a medium.	Acute dento- alveo. ab- scess.	<u>6</u> 0:2.2—0:2.5+ <u>5</u> 0:3.8—0:4.1+ <u>6</u> 0:3.2—0:3.5+ <u>7</u> 0:4.0—0:4.5+	Pulpitis. (The increase in the sen- sation.)	Pericemental abscess.	
14 43 M.	Wedge-shaped defect in the neck of the <u>4</u> Cold water— Hot water— Appearance normal	Pyorr. alveo. pres- ent. Gum swelling in a medium, and ex- tended to the cheek. Fever 38.3°C. Neuralgic pain.	Acute dento- alveo. ab- scess.	<u>4</u> 0:11.5+ <u>3</u> 0:12.5+ <u>5</u> 0:11.0+	Vital.	Pericemental abscess caused by the reinfec- tion of pyorrhea al- veolaris.	
15 23 F.	<u>1</u> <u>1</u> <u>3</u> Both very loose	Impaired appetite. Fever 39.3°C.	Dento-alveo. abscess.	<u>1</u> 0:5.5—0:6.0± <u>3</u> 0:2.8—0:3.1+	<u>1</u> Dead. <u>3</u> Vital.	<u>1</u> Pulp gan- grene.	To deter- mine the real cause.

SERIES OF EXPERIMENTS.

Sex No. and Age.	Main Symptoms of the Teeth Affected.	Other Dental Symptoms.	Clinical Diagnosis.	Electrical Reaction.	Electrical Diagnosis.	Results.	Notes.
16 37 M.	Appearance normal	Presence of a fistula between the 1 and 2	Pericemental abscess.	1 0:3.5 +	Vital.	Pulp gangrene. Ascending pulpitis.	To determine the real cause of the fistula.
	Percussion +			2 0:3.3 ±			
	Cold water ±			3 1:3.9 + (Presence of cement filling.)			
	Hot water ±			1 2:13.0 - 2:14.0 +			
17 27 M.	Loosening ±	Nothing wrong with the gum and other neighboring parts. Paroxysms of pain recurring several times; fits.	Pulp gangrene.	1 2:13.0 - 2:16.0 +	1 1 Both Dead.	Pulp gangrene.	
	Percussion +			2 0:2.9 +			
	Thermal stimuli ±			2 0:5.0 +			
	Appearance normal			3 0:1.8 +			
18 40 M.	Loosening +	Slight degree of pyorrhea alveolaris present. Facial neuralgic pain in the right side of the face. Ear pain. Sleepless. Calculus deposit in excessive quantity.	Periodontitis simplex.	7 0:5.0 - 0:5.2 +	7 Vital. 6 Dead.	6 Pulp gangrene.	Disease in the medicine department. Chronic gastro-intestinal catarrh. Dull pain in the knee joint (right side). Dull pain in the elbow joint. 6 With amalgam filling.
	Percussion +			7 0:3.8 - 0:4.1 + (From filling material)			
	Cold water ±			3:5.0 - 4:5.0 + (From tooth tissue)			
	Appearance normal			6 0:3.8 - 0:4.0 +			

SERIES OF EXPERIMENTS.

Sex and Age.	Main Symptoms of the Teeth Affected.	Other Dental Symptoms.	Clinical Diagnosis.	Electrical Reaction.	Electrical Diagnosis.	Results.	Notes.
19 38 M.	1 Small cavity (like pinhead) in the mesial proximal surface No loose Percussion \pm Cold water \pm	Nothing wrong with the gum. The center of the pain is obvious.	The first stage of the gangrene?	1 0:2.7-0:3.8+ 2 0:2.5+ 2 0:2.8+	Dead?	Dead.	Sensation of a medium degree as the cavity is opened.
20 48 M.	Loose + Percussion ++ Cold water ++ Appearance normal	Extensive pain from left side of the face to occipital part. Nothing wrong with the gum. Sleepless.	Chronic pulpitis complicated with periodontitis?	1 Labial 2:6.0-2:7.5+ Cutting edge 2:7.5+2:8.0++	Gangrene.	Dead. Excessive quantity of pus was discharged as the cavity was opened.	
21 36 M.	Appearance normal Loose ++ Water \pm Hot water \pm Percussion +		Periodontitis caused by the pulp gangrene.	3 0:7.0-0:7.7+ Cutting edge 0:7.2-0:8.6+ 3 Labial 0:3.3-0:3.5+ 0:3.6-0:4.5+	Dead.	Moist. Gangrene.	
22 40 M.	Appearance normal Loose ++ Water + H ₂ O ₂ solution + Hot water + Percussion ++ Formalin \pm Small cavity present at the central groove	Nothing wrong with the gum and others. Trigeminal neuralgia.	Periodontitis caused by the moist gangrene.	6 1:7.3-1:8.1+ 7 1:2.5-1:2.9+ 8 1:3.8-1:4.1+ 1 1:4.0-1:5.0+ 2 1:4.0-1:5.0+ 1 1:4.0-1:5.0+ 2 1:4.0-1:5.0+	Dead.	Chronic pulpitis.	Sensation of a medium degree and bleeding as the cavity is opened.

SERIES OF EXPERIMENTS.

Sex and No.	Age.	Main Symptoms of the Teeth Affected.	Other Dental Symptoms.	Clinical Diagnosis.	Electrical Reaction.	Electrical Diagnosis.	Results.	Notes.
23	30 M.	Appearance normal Loose + Water + Hot water + Percussion + Amalgam filling present	Nothing wrong at all.	Pulp gangrene or chronic pulpitis.	{ From amalgam 1:3.5-1:3.7+ { From enamel tissue 1:2.4-1:3.0+ <u>7</u> 1:2.4-1:2.8+	Vital.	Vital.	The sensation is quite dull.
24	30 M.	Appearance normal Loose + Water + Hot water + Opacity Percussion +	Present of a fistula between the stump roots of <u>4</u> and <u>3</u> tooth. <u>3</u> Some what nearer.	Obscure.	{ Labial 0:1.2+ { Cutting edge 0:1.2+ <u>3</u> { Labial 0:7.0-0:9.0+ { 0:6.0-0:8.0+	Vital. Vital.	Obscure.	The fistula was completely disappeared ten days after stump root of <u>4</u> extracted.
25	40 M.	<u>6</u>	The tooth development is very good. Constitution medium.	Exposed.	{ Palatal 2:3.5+ { Bucc. 2:2.0+ { Occlu. 1.5:2.3+			To examine, Test the resistant power of the pulp in an exposed state.
26	38 M.	<u>6</u>	The tooth development is very good. Constitution medium.	Exposed.	{ Palatal 2:3.8+ { Bucc. 1:3.2+ { Occlu. 0:4.5+			To examine, Test the resistant power of the pulp in an exposed state.

SERIES OF EXPERIMENTS.

Sex No. and Age.	Main Symptoms of the Teeth Affected.	Other Dental Symptoms.	Clinical Diagnosis.	Electrical Reaction.	Electrical Diagnosis.	Results.	Notes.
27 32 F. 6		The tooth development is very good. Constitution medium.	Exposed.	$\left\{ \begin{array}{l} 1:4.0+ \\ 1:2.5+ \\ 0:7.0+ \end{array} \right.$			To examine, Test the resistant power of the pulp in an exposed state.
28 18 F.	1. Gold filling present	Phthisis. All of her teeth are unhealthy condition. Excessive swelling of the gums. Fever 39.0°C. No appetite.	Acute subperiosteal abscess.	$\left\{ \begin{array}{l} \text{Labi. } \left\{ \begin{array}{l} \text{Gold } 0:9.0 \pm \\ \text{Enamel } 2:7.0 \pm \end{array} \right. \\ \text{Lingua. } 2:9.0+ \end{array} \right.$	Dead.	Moist gangrene of the pulp.	To determine the real cause treat for the abscess.
29 36 M.	Loose ++ Impaired mastication Water ± Hot water ± Amalgam present	Sleepless for five days. Gum swelling medium. Tonsillitis medium.	Dento-alveolar abscess.	$\overline{7} \ 0:2.5+ \\ \overline{6} \ 0:3.0+ + \\ \quad \ 0:2.0- \\ \overline{7} \ 0:3.5+0:3.3-$	Sub-acute pulpitis.	Vital.	
30 31 F.	Appearance normal Loose ++ Water ± Hot water ±	The gum is normal. Sleepless for six days. Facial neuralgia. Sensation of a medium degree at the opening of the cavity.	Periodontitis caused by the pulp gangrene.	$\overline{7} \ 1:4.0-4:6.0+ \\ \overline{7} \ 1:2.3-1:2.5+ \\ \overline{6} \ 1:2.0-1:2.6+$	Dead.	Dead.	

SERIES OF EXPERIMENTS.

Sex No. and Age.	Main Symptoms of the Teeth Affected.	Other Dental Symptoms.	Clinical Diagnosis.	Electrical Reaction.	Electrical Diagnosis.	Results.	Notes.
31 38 M.	Not discolored Loose ++ Impaired mastication Cold water — Hot water —	Nothing wrong in the gum and other neighbor- ing tissues.	Pulp gan- grene.	3 2.6.0—2.6.6 + 3 0.3.9—0.4.5 +	Dead.	Dead.	Sensation of a medium degree at the open- ing of the cavity. The pa- tient has been in- jected with "Sal- varsan" in the Der- matologi- cal Dept.
32 29 F.	No discoloring Loose + Percussion + Water + Hot water +	The gum some- what redness only; nothing wrong more.	Pulp gan- grene.	12 0.6.5—0.8.5 ± 1 0.1.3—0.1.6 + 1 0.2.5—0.3.0 + 2 0.2.6—0.2.6 +	Dead.	Dead.	No teeth around to apply a control exami- nation.
33 52 M.	Mechanical abrasion of a medium degree Loose ++ No cavity at all Percussion ++ Water and hot water — Impaired mastication	Gingivitis margin- alis totalis. Presence of exces- sive quantity of calculus deposit. Trigeminal neu- ralgia. Sleepless for seven days. No appetite.	Periodontitis caused by the pulp gangrene.	7 1.3.5—1.6.8 + 6 0.4.0—0.4.5 + 7 0.4.8—0.5.0 + 6 0.4.0—0.4.5 + 1 0.6.0—0.4.2 + 1 0.3.9—0.6.1 + +	Obscure.	Vital.	6 Pulp ex- posed. 7 Pulp ex- posed. 6 Pulp ex- posed. 1 Appearance 1 Normal. a medium drilling the

SERIES OF EXPERIMENTS.

No.	Sex and Age.	Main Symptoms of the Teeth Affected.	Other Dental Symptoms.	Clinical Diagnosis.	Electrical Reaction.	Electrical Diagnosis.	Results.	Notes.
34	42 M.	Loose ++ No tenderness No discoloring Hot and cold water — Percussion ±	External side of the cheek is greatly swollen. The gum swelling is a medium degree. Fever 39°C. The chill comes two or three times daily.	Acute subperiosteal abscess caused by the pulp gangrene.	$\overline{6}$ 0:4.3 ± 0:4.5 + $\overline{7}$ 0:4.5 ± 0:5.5 + $\overline{1}$ 0:3.3 — 0:3.6 + $\overline{2}$ 0:3.3 — 0:3.6 + $\overline{1}$ 0:3.2 — 0:3.6 + $\overline{2}$ 0:3.2 — 0:3.6 +	Vital.	Vital.	Of all those teeth are well developed.
35	33 M.	Loose + No tenderness No discoloring Percussion ++	$\overline{2}$ Intensity of pressure pain felt at the gum near the part of the apex. The gum swelling a medium degree 38.5°C. Impaired appetite.	The early stage of the dento-alveo. abscess caused by the pulp gangrene of the $\overline{2}$	$\overline{2}$ 2:7.6 — 2:7.8 + $\overline{2}$ 1:2.2 + $\overline{1}$ $\overline{1}$ both 1:2.0 + $\overline{3}$ $\overline{3}$ both 1:2.8 — 1:3.0 +	Dead?	Obscure.	The attempt of the drilling was given up because of the great pressure pain.
36	33 M.	Percussion + Loose + Tenderness ±	Appetite good. Temperature is Normal. The swelling decreased. Little or no pressure pain felt.		$\overline{2}$ 1:3.0 — 1:3.2 + + $\overline{2}$ 1:1.9 — 1:2.0 + $\overline{1}$ $\overline{1}$ 1:1.0 — 1:1.5 + $\overline{3}$ $\overline{3}$ 1:2.7 — 1:3.0 +			Complete cure without any special dental treatment to the tooth $\overline{2}$.

On the fourth day after the above examination and on the seventh day after the incision of the gum, another electro-diagnosis was conducted, the results of which are as follows: (No. 36)

SERIES OF EXPERIMENTS.

Sex No. and Age.	Main Symptoms of the Teeth Affected.	Other Dental Symptoms.	Clinical Diagnosis.	Electrical Reaction.	Electrical Diagnosis.	Results.	Notes.
37/25 F.	$\left. \begin{array}{l} 1 \} \text{ Presence of traumatic superfi-} \\ 2 \} \text{ cial cracking} \\ 3 \} \text{ in the enamel.} \end{array} \right\}$	Nothing wrong with the gum and others.		$\left. \begin{array}{l} 1 \} 1:2.8+ \\ 2 \} 1:2.6+ \end{array} \right\}$	$\left. \begin{array}{l} \text{Labial } 1:3.0+ \\ \text{Tip. } 0:6.0+ \\ \text{Palat. } 1:3.5+ \end{array} \right\}$ Vital.		To determine whether the pulp is dead or otherwise by the traumatic agency.
38/26 F.	$\left. \begin{array}{l} 4 \} \text{ The development of the tooth is normal.} \\ \text{Somewhat blue-yellow color, trans-} \\ \text{parent.} \\ \text{The mouth is very unclean.} \\ \text{Does not take special care regarding} \\ \text{the hygiene of the mouth.} \\ \text{In the cause of "pleurisy."} \end{array} \right\}$			$\left. \begin{array}{l} 4 \} \text{ Labial } 0:6.6+ \\ \text{Occ. } 0:10.0- \end{array} \right\}$	$\left. \begin{array}{l} \text{Dead?} \\ \text{Labial } 0:2.8-0:3.0+ \\ \text{From stopping } 1:11.0+ \\ \text{Occ. } \left\{ \begin{array}{l} \text{From Enamel} \\ 1:2.0+ \end{array} \right\} \end{array} \right\}$	Dead.	To determine whether the pulp is dead or not.
39/45 M.	$\left. \begin{array}{l} 7 \} \text{ Tooth development well.} \\ \text{Constitutional condition good.} \end{array} \right\}$			$\left. \begin{array}{l} 7 \} \text{ Labial } 0:6.2-0:6.5+ \\ \text{Occ. } 0:6.7+ \\ \text{Lingual } 0:7.0-0:7.5+ \end{array} \right\}$	Vital.		To determine whether the pulp is dead or not.

SERIES OF EXPERIMENTS.

Sex and Age.	Main Symptoms of the Teeth Affected.	Other Dental Symptoms.	Clinical Diagnosis.	Electrical Reaction.	Electrical Diagnosis.	Results.	Notes.
40 33 F.	4 Tooth development is very bad; seems to be very soft.	Intensity— Hysteria. Put some As_2O_3 paste for the pulp devitalization two days before this examination.		$\left\{ \begin{array}{l} \text{Labial } 2:5.8 \pm \\ \text{occ. } 2:5.4 + \end{array} \right\}$ $\left\{ \begin{array}{l} \text{From over the surface cauterized } 4 \\ \text{Labial with silver nitrate crystal. } 0:4.6 + \\ \text{From over enamel. } 0:9.0 + \end{array} \right\}$ $\left\{ \begin{array}{l} \text{Labial } 1:7.6 + \\ \text{occ. } 1:4.7 + \end{array} \right\}$ $\left\{ \begin{array}{l} \text{Labial } 1:6.0 + \\ \text{occ. } 1:4.6 + \end{array} \right\}$	Completely effected.		To determine whether the As_2O_3 is completely effected or otherwise.
41 30 F	7 Water + Hot water +	The gum is normal. Trigeminal neuralgia. Sleepless for fifteen days.	Pulp gangrene?	$\left\{ \begin{array}{l} 7 \text{ } 1:4.0 - 1:4.2 + \\ 6 \text{ } 1:2.3 - 1:2.5 \pm \\ 6 \text{ } 1:1.8 - 1:2.1 + \\ 7 \text{ } 1:2.5 - 1:2.9 + \end{array} \right\}$	7 Dead?	Gangrenous pulpitis.	Sensation of a medium in degree as cavity is opened.
42 43 M.	1 Percussion + + Water + Hot water - Loose + + Presence of "gold filling."	The gum is swollen in a medium degree. Fever 38.5°C.	Acute dento-alveolar abscess.	$\left\{ \begin{array}{l} 1 \text{ } 1:8.0 - 2:2.0 + + \\ 2:1.0 + \\ 1 \text{ } 0:2.0 - 0:3.0 + \\ 2 \text{ } 0:1.8 - 0:3.0 + \\ 2 \text{ } 1:3.5 - 1:4.0 + \end{array} \right\}$	1 Dead?	Gangrenous pulpitis.	

SERIES OF EXPERIMENTS.

Sex and Age.	Main Symptoms of the Teeth Affected.	Other Dental Symptoms.	Clinical Diagnosis.	Electrical Reaction.	Electrical Diagnosis.	Results.	Notes.
43 40 M.	<p>$\overline{7}$ Loose + +</p> <p>Cold water + +</p> <p>Hot water ±</p> <p>Percussion +</p> <p>Appearance normal</p>	<p>Surrounding gum is somewhat red and swelling in a medium.</p> <p>Posterior root is slightly exposed.</p> <p>Paroxysms of pain recurring several times.</p> <p>Fits.</p>	<p>Chronic pulpitis.</p>	<p>$\overline{7}$ 0:8.0 ± 0:10.0 +</p> <p>$\overline{6}$ 0:7.0 +</p> <p>$\overline{7}$ 0:4.0 +</p> <p>$\overline{6}$ 0:6.0 +</p> <p>$\underline{1}$ } 0:3.5 - 0:4.0 +</p> <p>$\underline{1}$</p>	<p>Vital.</p> <p>(Much decreased in sensation.)</p>	Nearly dead.	Sensation of just a little as the cavity is opened. <p>To determine the real cause of the loose $\overline{7}$</p>
44 38 F.	<p>$\overline{6}$ Loose + +</p> <p>Water +</p> <p>Hot water ±</p> <p>Percussion +</p> <p>Appearance normal.</p>	<p>The surrounding gum is swollen and redness in a medium of degree.</p> <p>Paroxysms of pain recurring in the evening.</p>	<p>Chronic pulpitis.</p>	<p>$\overline{6}$ 1:2.0 - 1:2.0 +</p> <p>$\overline{7}$ 1:3.0 - 1:3.5 +</p> <p>$\overline{7}$ 1:2.3 - 1:2.5 +</p> <p>$\overline{6}$ 0:3.0 - 0:3.2 +</p>	Vital.	Vital.	To determine the cause of the loose $\overline{6}$'s <p>$\overline{6}$ Mechanical abrasion present.</p>
45 53 M.	<p>$\underline{1}$ Appearance normal.</p> <p>Loose +</p> <p>Water ±</p> <p>Percussion +</p>	<p>The gum is apparently red and swollen in the region of $\underline{1}$'s root.</p> <p>Presence pyorrhea alveolaris in all of teeth.</p>	<p>Dead.</p>	<p>$\underline{1}$ 2:10.0 - 2:14.0 +</p> <p>$\underline{1}$ 0:7.0 +</p> <p>$\underline{2}$ 0:3.0 - 0:3.8 +</p> <p>$\underline{2}$ 0:8.0 - 0:8.5 +</p> <p>$\underline{3}$ $\underline{1}$ 3:11.0 +</p>	Dead.	Pulp gangrene.	He has suffered with diabetes.

SERIES OF EXPERIMENTS.

Age. No. and Sex	Main Symptoms of the Teeth Affected.	Other Dental Symptoms.	Clinical Diagnosis.	Electrical Reaction.	Electrical Diagnosis.	Results.	Notes.
46 42 M.	<u>1</u> Loose + Slightly discolored. Water ± Hot water ±	The gum is swollen in a medium degree. Fever 38.8°C.	Dento-alveo. abscess?	<u>1</u> 1:2.5 + <u>1</u> 1:2.5 + <u>2</u> 1:2.5 + <u>3</u> 1:3.0-1:3.5 + +	Pulp is vital.	Pericemental abscess	
47 30 M	<u>6</u> Water + + Hot water + + Presence of cavity, but filled with cement.	Nothing wrong with gum or other neighboring parts.	Acute pulpitis.	<u>6</u> 0:1.5-0:2.0 + <u>5</u> 0:3.0-0:3.5 + <u>4</u> 0:2.0-0:2.7 + <u>6</u> 1:2.0-1:3.0 +	Acute pulpitis.	Acute pulpitis.	
48 31 M.	<u>1</u> Loose + + No discoloring. Water ± Hot water ±	The gum is swollen in a medium degree. Presence pyorrhea alveolaris in full teeth.	Pericemental abscess.	<u>1</u> 1:1.0-1:2.5 + <u>1</u> 1:5.0-1:1.5 + + <u>2</u> 0:2.5-0:3.0 + <u>2</u> 0:3.0-0:3.3 +	Vital.	Pericemental abscess. The sensation is somewhat decreased?	
49 29 F.	<u>2</u> <u>1</u> <u>1</u> <u>1</u> <u>2</u> No discoloring. Loose + + + Percussion + + Water + Hot water +	The gum is excessively atrophied, and swollen in a medium degree. Presence pyorrhea alveolaris.	Obscure.	<u>1</u> 0:3.0 + + <u>2</u> 0:3.2 + + <u>1</u> 0:3.0 + + <u>2</u> 0:3.2 + + <u>1</u> 0:6.0 + + <u>2</u> 0:6.0 + + <u>1</u> 0:6.5 + + <u>2</u> 0:9.0 + +	Pulpitis subacute. Pulpitis. (The sensation is greatly increased)		Extracted.

SERIES OF EXPERIMENTS.

Sex and Age.	Main Symptoms of the Teeth Affected.	Other Dental Symptoms.	Clinical Diagnosis.	Electrical Reaction.	Electrical Diagnosis.	Results.	Notes.
50 18 M.	<div> <div> <div>1</div> <div>2</div> <div>1</div> <div>2</div> </div> <div> <div>1</div> <div>2</div> </div> </div> <div>Appearance normal.</div> <div>Very loose.</div>	<div>The gum is torn off.</div> <div>Periosteum is exposed.</div> <div>Excessive quantity of bleeding.</div> <div>The patient has knocked his tooth with a boy's head.</div>	Obscure.	<div>1 0.4.0 +</div> <div>2 0.3.8 +</div> <div>1 0.3.6 +</div> <div>2 0.3.9 +</div>	<div>Vital.</div> <div>(The sensation is much increased.)</div>	<div>Vital.</div> <div>The pulp is avulsed from off by traumatic agency.</div>	<div>Completely healed up after four weeks.</div>
On the thirty-fifth day after the above examination another electro-diagnosis was conducted, the results of which are as follows:							
51 18 M.				<div>1 1.2.8 +</div> <div>2 1.2.8 +</div> <div>2 0.4.5 +</div> <div>2 0.5.5 +</div>	<div>Normal.</div>	<div>Normal.</div>	
52 50 M.	<div>1 1</div> <div>Loose +++</div> <div>Percussion +++</div> <div>Water ++</div> <div>Hot water +</div>	<div>The gum atrophy is excessive and the tooth is scarcely attached to the gum.</div> <div>No swelling.</div> <div>Presence pyorrhea alveolaris.</div>	<div>Pericementitis, complicated with pulpitis.</div>	<div>1 1.0.2.5 +</div> <div>2 2.6.4.2 +</div> <div>1 1.1.3.0 +</div>	<div>Pulpitis.</div> <div>(The sensation is on increase.)</div>	<div>Vital.</div>	<div>Extracted.</div>

It is an undisputed fact that secondary dentin presents a far higher co-efficient of electrical resistance than normal dentin; also it is known that inflamed pulp requires less stimulus than normal to produce a response, whilst dying pulp requires more than normal.

As Dr. Tousey of Boston pointed out in his valuable essay in the *Dental Cosmos*, May 1909, P. 513, entitled "The Faradic Current in Dentistry;" it is no less impossible to standardize the electrical resistance of the tooth than that of the body.

In my opinion, the only cases in which this method may be of value are in determining whether

1. the pulp is vital, dead or dying
2. the pulp is inflamed or otherwise.

I am almost convinced that it is impossible to diagnose minutely the condition of the pulp by this method as Drs. Prinz Schröder and others contend owing to the fact that it is impossible to measure the strength of the Faradic current. Moreover, the power of the current obtained from the common battery varies considerably according to the time the battery has been in use.

The internal resistance of the cells increases with use but the voltage decreases.

The strength of an induction current may be ascertained by multiplying the voltage and the number of the coil turns.

If V represents the voltage, N the number of the coil turns and P the strength of the induction current, then

$$P = VN \text{ approximately.}$$

Assuming $V = 1$, $N = 300$, then $P = 1 \times 300$; therefore if the voltage decreases to 0.5, then $P = 0.5 \times 300 = 150$ approximately.

Thus any fall in voltage will obviously produce a corresponding diminution in the strength of the current.

In practice we must also take into consideration the diameter of the primary and secondary coils, and the distance separating the two and the electrical resistance of the respective parts of the apparatus.

By a series of investigations I arrived at the following conclusions:

1. About ninety per cent, or little more, of the pulp of the teeth affected from pyorrhea alveolaris are vital, even though the teeth are so loose as to be attached to the gum tissue scarcely by one-half of the apical third, and can be easily extracted with slight finger pressure. In the treatment of teeth affected by pyorrhea alveolaris, therefore, we must endeavor as far as possible to save them.

2. The loosening of the teeth in cases of advanced stage of pyorrhea alveolaris is mostly caused by pulpitis, not by pericementitis, which is caused by pulp gangrene; even if the tooth responds to the percussion by great tenderness, and there is disturbance in mastication. In the treatment, therefore, one must take special care of it.

3. We can diagnose in 100 per cent. cases of dental caries and cracking of the enamel tissue by the aid of this method even if these cases are very slight.

4. There is a considerable difference in the reaction between the inflamed pulp and a non-inflamed pulp. We can not, however, decide minutely the extent of an inflammation.

5. In practice, in my opinion, it is not possible to make sharp demarcation between sensation and pain, but it is not necessary to do so, as Dr. Fromman, Prof. Schröder and Dr. Prinz have pointed out.

6. The degree of response of any tooth is not only quite different in individual cases, but also in the same tooth of the patient, varying even in the morning and the evening. To obtain the degree of response of any tooth by this method, therefore, we must make two observations at least (for instance, in the morning and in the evening or within an interval of half an hour between the two).

7. As stated above, it is scarcely possible to determine an accurate degree of response in each tooth. It is of course necessary to have a control in the corresponding tooth of the opposite side in each case.

8. According to my experience, it is not necessary that the existence of a pulp nodule in the chamber or root canals become a causative factor of facial neuralgia, and also it may have no influence on the electric reaction provided the pulp nodule is

in existence and the dental pulp remains about the apical third.

9. The following points must be borne carefully in mind in order to obtain a correct result:

a) The condition of the patient, especially as to whether he has taken a narcotic (such as morphine, bromural, veronal, etc.)

b) The polarization of the battery increases the internal resistance and consequently reduces the voltage. More than one observation, therefore, is necessary.

c) The condition of the tooth, age and constitutional condition of the patient.

d) For the observation we must take special care of the saline solution which flows out through the dental glass tube electrode.

e) As the current used is an alternating one, it makes no difference whether the dental glass tube is connected with the positive or negative pole.

10. The electro-dental diagnosis for pulp diseases is far superior to any other five methods described. But it should be remembered that it is not absolute in every case as Dr. Hermann Prinz of Philadelphia stated in his valuable work entitled "Dental Material Medica and Therapeutics P. 522."

11. In most complicated cases, therefore, one must employ every measure of diagnostic aid, and decide not by this Electro-dental diagnosis only.

The conclusions drawn by the writer are:—

(1) AS REGARDS THE DENTAL ELECTRODE,

(a) The smaller the apex of the dental electrode, the better the result.

(b) The saline solution contained in the electrode should be so contrived as to issue in a small drop with the appliance of slight pressure, same as Prof. Calmit's thermometer system.

(2) AS REGARDS THE BATTERY,

(a) In order to increase the capacity of the battery and to reduce its internal resistance keeping the voltage as constant as possible, it is desired to arrange the battery by means of parallel connection. To obtain this we can verify by the following equations:—

f e represents the voltage

b the internal resistance

n the number of batteries,

then in a series of connections,

the total voltage $= ne$

the total internal resistance $= nb$

Again, if r represents the external resistance

I represents the main current,

then, the total resistance of the circuit $= nb + r$

$$I = \frac{ne}{nb + r}$$

while in a parallel of connections, the total voltage is of course the same as one battery, but it has the following advantages:

The total internal resistance is reduced to $\frac{b}{n}$

so that the total voltage $= e$

the total internal resistance $= \frac{b}{n}$

the external resistance $= r$

the total resistance of the whole circuit $= \frac{b}{n} + r$

$$I = \frac{e}{\frac{b}{n} + r}$$

$$\text{or } I = \frac{ne}{b + nr}$$

(b) Otherwise it is desirable to employ a secondary battery or an accumulator, because there is no polarization in an accumulator, consequently the internal resistance is very small and it furnishes a constant current.

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NOTES FROM THE SURGICAL CLINIC OF DR. TRUMAN W. BROPHY.

REPORTED BY EARLE H. THOMAS, D. D. S., SUPERVISOR OF CLINIC.

CASE 55, Mr. M. O., age 26; presented with an enormous swelling on the left side of the neck, extending from the cheek to within 3 c. m. of the clavicle; pulse, 87; temperature, 101; patient complained of anorexia and was in a very debilitated condition. Palpation revealed fluctuation. Patient gave the history of an acutely abscessed lower third molar, having been extracted one week previously. An incision was made through the skin only at the most dependent portion of the swelling, and a blunt hemostat was forced into the cavity and the blades opened, thus evacuating a whole pus basin full of pus. A drain of iodoform gauze was inserted and the cavity irrigated with normal saline solution every day, the parts healing very nicely in one week. This case shows very vividly the folly of extracting in the midst of any acute suppurative condition.

CASE 20, Mr. H. J., age 18; presented with a cleft of both hard and soft palates, with two peculiar features, one being that the soft palate was exceedingly short in its longitudinal axis, the other being that the inferior border of the vomer was bifurcated and spread out laterally to almost close the defect in the hard palate. The periosteum over the hard palate was stripped up until it met in the median line without tension, the margins of the cleft were pared as far back as the uvula, silver wires at-

attached to lead plates were passed through the tensor palati muscle on each side and tightened until all tension was taken off the line of union, which was then sutured with horsehair sutures as far back as the uvula. Then seeing that the soft palate of normal anatomic length was too short to completely shut off the oral cavity from the naso-pharynx, the adjacent margins of the palato-pharyngeus muscle were pared and united with horsehair sutures to the distance of 2 c. m., thus making a palate extending posteriorly 2 c. m. farther than the uvula. Sutures, silver wires, and lead plates were removed ten days after the operation, leaving the palate quite long enough to come in contact with the posterior wall of the pharynx, thus making perfect phonation possible.

CASE 38, Mr. F. C., age 33; the past history, as he tells it, is that he was bitten on the finger thirteen years ago by a person having specific disease. A chancre developed at the spot and the finger was amputated—for what reason it was amputated we do not know. One year ago he began to have trouble with his teeth, and on visiting several dentists was informed by each of them that he had pyorrhea alveolaris. He presented at the clinic with necrosis of hard palate and nasal septum. A sequestrum having already been formed, it was removed, leaving the nose and mouth in communication with each other. He was placed on antisyphilitic treatment and after the parts had nicely healed an obturator was constructed to help do away with the inconvenience caused by the deformity. This case is only one of the many we see similar to it, and it only goes to show that the dentist is under an obligation to his patients to be able to recognize syphilis, especially in the early manifestations of the third stage.

CASE 60, Mr. R. P., age 32; presented with pus discharging both labially and lingually of the upper left central. This tooth had been treated for three months to clear up the abscess condition, but with no results. Careful examination revealed the fact that the cuspid on the left side was a deciduous one, although it was of practically the same size and shape as a permanent one. A Röntgenogram revealed the large permanent cuspid with its root fully formed, lying transversely in the palate. Under a general anesthetic it was removed by first tak-

ing away the plate of bone over it, cutting the tooth in two at the neck and removing it in two pieces with elevators. The cavity was packed with iodoform gauze and in a few days the wound healed nicely, as did also the other two sinuses. This is a good illustration of the fact that it needs more than a casual glance to tell which tooth is involved when there is a sinus directly over the apex of the root of a certain tooth.

CASE 45, Mr. J. B., age 30; presented complaining of neuralgic pain in the eye on the left side and the cheek below it. This had been causing him trouble for eighteen years, which was always intensified by tobacco smoke. Thermal changes always brought on a severe frontal headache. The case was completely cured by the injection of alcohol into the left infraorbital nerve. Alcohol injections control the pain in these cases for a variable length of time, but the subsequent history shows that the neuralgia is very likely to recur.

CASE 33, Mrs. F., age 33; presented with a soft sessile growth of a reddish-purple color on the ridge of the upper jaw in the median line. The tumor was painless. The two centrals had fallen out two years previously from extensive disease around their roots and this growth had started one year later. It was diagnosed as a soft form of epulic fibroma and was removed under nitrous oxid anesthesia, the parts healing nicely in a few days.

REPORT OF THE COMMITTEE ON STATISTICS.*

BY DR. M. R. HARNED, ROCKFORD, ILLINOIS.

Your committee on statistics was instructed to continue the study of gingivitis for this year. It seems to have been an "off" year. Our efforts have been beset by many delays and hindrances. We tried the experiment of sending out cards to members, asking for suggestions and offers to make examinations, to which we received 15 responses and requests for about 500 cards, but owing to unforeseen events, only a small portion

*Read before the Northern Illinois Dental Society.

of these cards have been returned, and we have to report upon but 101 patients for the year 1914.

We have continued the use of examination cards practically as in the year 1913, adding but two points; one, which is numbered "30" (etched enameled margins) as a cause for gingivitis, and another number which is entitled "X" (cause unknown).

From the information tabulated with regard to the 101 patients with an average age of 26 years—plus, and a total of 1,086 markings, or an average of $10\frac{3}{4}$ per patient, we find but one patient free from gingivitis marked as being in perfect condition. This is rather appalling; that less than one per cent of patients examined should be free from gingivitis.

In compiling the information, I have been again impressed with the fact that gingivitis is due almost entirely to neglect of patient or operator, or both, and probably ninety per cent of patients having gingivitis could be classed under No. 17—lack of cleanliness. The markings, however, number only 143, and the most common cause for gingivitis is given as No. 28—deposits of salivary calculus, with 422 markings. Next to this is No. 29—serumal calculus, with 229 markings. Both these markings are the result of neglect on the part of the patient, and yet the next in order of significance is No. 27—improper margins of fillings or crowns, with a total of 94 markings, which indicates a neglect on the part of operators.

This divided responsibility is probably the true relation which exists with regard to gingivitis. The average patient does not care for his teeth and gums because he has not been properly impressed with the importance of their care. Our patients depend too largely upon their visits to us and pay little attention to the instruction which we give them with regard to their own care of the teeth, so that, while the markings would indicate that the responsibility rests most heavily upon the patient, the truth is that we should share this by reason of the fact that we have not impressed upon them sufficiently the necessity of their own efforts.

The result of making these examinations and of compiling this information confirms the opinion held by authorities upon diseases of the peridental membrane, that pyorrhea invariably

starts with gingivitis and develops to the deeper and more mailgnant disease; that the preventive treatment of pyorrhea consists in the allaying of gingivitis at the earliest possible stage.

I wish, on behalf of the committee, to thank those who aided us in the work, and to express my gratitude for your patience in this experiment, from which I had hoped might come a greater and more permanent contribution to dental information.

Respectfully submitted,

M. R. HARNED,

A. D. BLACK,

W. C. McWETHY,

Committee on Statistics.

SCIENTIFIC OCCLUSION.*

BY CHESTER RALPH ROOT, D. D. S., ASHTON, ILL.

I was asked to present a paper at this meeting relating to the practicability of the face-bow in conjunction with the Snow occluding frame, in the construction of artificial dentures.

I am still following the methods learned at college from Dr. Prothero's lectures and instructions received in the infirmary, and the reason for my so doing, is, the results have been satisfactory.

Plaster is employed in taknig impressions in all partial cases, in edentulous cases when the ridges are flabby, and in cases when the oral tissues generally have a spongy tendency and in cases of projecting points of alveolar process or undercuts. I use this because an impression can be obtained with much less pressure being exerted, thereby avoiding dis-arrangement of natural conditions. Massaging the periphery of the impression immediately upon insertion is done and the patient instructed to move the mouth and lip muscles in varied appositions so the periphery of impression will have indentations of those muscles made while functioning, subsequently helping to prevent displacement of dentures molded on models obtained from impressions thus treated.

*Read before the Northern Illinois Dental Society.

Compound is used only in edentulous cases having hard ridges and tissues generally. I prefer this material whenever indicated because finer impressions of detail can be obtained by allowing more time to manipulate it and can be reheated on the surface without destroying the general impression. Its cleanliness and lack of nauseating effects in comparison make it desirable.

The patient is dismissed for this sitting after having obtained the impression and when he comes for the next, the base plates have been conformed and built up with wax ready for the first try in.

The upper impressions are trimmed or scraped in the region corresponding to the highest portion of the vault according to the extensiveness of hard area before the model is poured. As soon as the model is secured, it is scraped at the desired periphery of plate to the depth of one and one-half millimeters at posterior margin, and to a lesser depth above the ridges, and the base plates conformed. Ideal base plate is the best type because the shrinkage and warpage caused from the subsequent heating is less, and because it is more rigid. It will break easily unless used with considerable caution.

The wax rims are now added to the conformed base plate. I am taking a case of full upper and lower as an example. At the second sitting the plates are inserted into the mouth and removed to add to or trim so both plates rest solidly when the jaws are closed.

The heads of condyles are located by opening and closing the jaws and are marked with a pencil. Remove the plates and into the upper wax rim insert the stem by heating in flame of lamp. Chill the plate and wax with stem attached and re-insert both plates in mouth.

Instruct patient to close and the plates are stapled together or waxed. Apply the bow and see that the same number of notches are registered on both sides before tightening. The patient supports the end of stem in case an assistant is not present, while the slides are centered and tightened directly on marks made with the pencil. Now tighten the thumb set, release the slides, and remove plates and frame intact to the laboratory.

I have patient wait if possible, while I mount on occluding frame so the protrusive bite can be obtained at this appointment.

In mounting, the bow is attached to the frame and the models worked into their respective bases and waxed there before mixing the plaster.

Now mix and fasten both models to frame.

After this sets, remove base and separate the models and re-insert in the mouth. The median line and high and low lip lines are recorded on the wax rims. Have patient bite forward a few times to learn what is wanted, and then in the region of lower first molars place the bite lugs somewhat lingually and have the jaws closed in protrusion.

Remove from mouth before the jaw retracts. The set screws on the frame are loosened and the spring thrown off and the models worked into their bases. The degree of each condyle movement is now registered on the frame, and the screws are again tightened. Separate the plates and re-attach the spring.

Dismiss the patient as soon as the protrusive bite is obtained.

We are now ready to cut the compensating curve. This is cut and shaped so that the rims closely approximate everywhere when the frame is worked laterally and protruded.

When this is accomplished the teeth are set up, commencing with the upper centrals and placing each tooth singly on that side by cutting just enough wax away to make room for the tooth. The lateral swinging and protruding is tried out after each tooth is set up. Powdered soapstone is used on the wax rim surface to permit sliding.

The other side of uppers are set up using the same precautions, and then the lower teeth are set up commencing with the second bicuspid and following with the molars of the same side. Go to the other side and place the same way and then place the first bicuspid and anteriors.

To obtain the three point contact, some grinding of the cusps of some of the teeth is usually necessary but with the present forms of anatomical teeth extensive grinding is unnecessary. All grinding that I have done has been entirely from the frame for never have I found it necessary to grind after testing the set up teeth or after vulcanization.

I have always given a trial before vulcanizing but have never yet made an alteration after so doing, so in the future I expect to complete cases that I feel reasonably sure the bite was given correctly, without a try in.

Only two plates have I re-constructed on account of poorly set up teeth and those were cases that could not be gotten to do as wanted in carrying out the preliminary step.

I firmly believe the face bow and the anatomical occluding frame produce much more useful results and are a time saver when re-constructed cases and after grinding of less decisive methods are taken into consideration. The seeming complications of this method and time thought to be required in using it seem to discourage some men from adopting it, but there is nothing complicated about it once the idea is grasped, and as I cannot tell you as I know it I would like very much to be able to show you one practical case.

I see my patient first for the impression, secondly for trial of base plates, use of face bow and protrusive bite which requires probably an hour in the average case, thirdly for the trial set up teeth and lastly for the finished plate although I would usually just as soon mail the dentures to them. Probably two hours is spent at the chair all together in making a full denture above and below, but there is some consolation in feeling safely launched.

I do not consider the use of the face-bow and the registering of condyle path of practical value in but a very small percentage of partial cases, consequently, I do not use it.

PROCEEDINGS OF SOCIETIES.

CHICAGO DENTAL SOCIETY.

A regular meeting was held October 20, 1914, with the President, Dr. T. L. Grisamore, in the Chair.

Dr. J. V. Conzett, Dubuque, Iowa, read a paper entitled "The Present Status of the Cast Gold Inlay."

Dr. Arthur D. Black followed with a paper entitled, "The Present Status of the Gold Foil Filling."

DISCUSSION.

DR. VICTOR H. FUQUA:

We are exceedingly fortunate tonight in having presented to us these able papers by two such distinguished authors and teachers as Drs. Conzett and Black.

The most important subject the dental profession has to deal with today is the *Prevention of Dental Lesions* and next in order comes their repair.

After listening to these two classics it does seem that we have reached the limit of human skill in so far as we are able to save teeth by filling with foil or cast gold.

To the really conscientious operator it matters little which method shall be used, his full purpose is to perform the operation that will be of most service, at the same time inflict as little discomfort as is possible to the patient.

Each cavity is a law unto itself. Every experienced operator knows his ability as well as his limitations and just so must he be guided by the different laws which govern the different cavities, methods and material.

We have need for all the filling material at hand today, including the silicates, and by way of parenthesis I might say we will need the silicates a little more when the manufacturers can give us a better product.

In a paper read before this society some five or six years ago your speaker likened the foil filling to the ox-cart method of transportation as compared with the automobile. I am still of the same opinion. However I want to admit that I have been "ditched" often enough in my rapid transit to make me take an occasional trip on the ox-cart.

In other words my foil pluggers are not rusting and at the same time that little steam pad is blowing out 80% of the metal fillings that go out from my hand.

Dr. Black as a teacher of operative dentistry has of necessity been very conservative in his estimate of the cast filling and has entirely overlooked the very features or possibilities of the cast gold filling that are impossible with foil.

I mention the gaining and maintaining of contact, restoration of tooth form, carving of cusps, grooves and sulci. The making of a perfect cast filling is no more of an experiment today than is a foil filling.

Dr. Black's laboratory experiments are interesting and instructive, but I am not impressed with the results obtained by malleting foil into a block of ivory held tight in the jaws of a vise and comparing this filling with a like one of 24-karat cast gold.

This is hardly a fair comparison, for we all know that it is impossible to condense foil into any such solid mass in the mouth as can be done in a block of ivory.

Dr. Black has spoken of the laying on and malleting foil in such a manner as to "actually force the walls of the dentin back in such a way that they maintain a constant grip on the filling." I am inclined to think that if this wedging and malleting process is carried to the extent Dr. Black says it is, that in so doing we naturally endanger the life of the pulp and the walls of the cavity by checking and I wonder if this "forcing back of the dentin" has not been the cause of the death of so many pulps in cavities of normal size and depth.

In this splendid paper of Dr. Conzett's he acknowledges that foil is "still the king of all filling materials," and at the same time he has clearly demonstrated that the gold inlay possesses all the qualities that we demand of a good foil filling, ease of manipulation and minus the great discomfort to the patient.

Dr. Conzett has said the gold inlay needs no apologist and Dr. Black has proven to us that foil needs no defender.

The question narrows itself down to one of personal equation with the balance in the favor of the inlay.

I am convinced that more teeth are being saved by this humane method than any other.

Our successes or failures will be measured by our ability to

faithfully regard the great system of cavity preparation given us by Dr. G. V. Black.

Dr. Konzett seems to have given us the very last word on the subject of the cast inlay. He has shown us the pitfalls when our failures are made and at the same time shown us how these may all be overcome and success attained. I am so thoroughly in accord with Dr. Konzett that it will be impossible for me to offer a single criticism as to his methods or technic. I am sorry, however, that he has not told us, as Dr. Black has done, when and where these two methods of filling teeth are indicated.

For fifteen years the gold inlay has played an important part in my practice. Seven years ago, when Dr. Taggart gave us the cast inlay, I practically abandoned the use of foil for some time. My failures began to appear, always occurring in small proximal and gingival cavities of the six anterior teeth and gingival cavities of the molars and bicuspid. Practically all of these cavities where gold is indicated I now fill with foil, believing I am rendering my patients better service, sacrificing less tooth structure and saving time.

The dental profession is at times inclined to be swayed by popular enthusiasm on some subject and immediately abandons all old methods for the new. Afterward the pendulum swings back and the new method finds its rightful place.

So it is with the gold inlay—it has found its place and it has come to stay. It is possible to successfully fill every cavity in the human mouth with gold inlays, but I know that in the mouths of patients of the most skilled operators you will find the little foil filling nestling down close and snug near his big tough brother, the gold inlay.

DR. EUGENE MAGINNIS:

The papers this evening are so complete and are so evident of the master mind and skilled hand that they are at once easy and difficult to discuss. Easy if one simply agrees with them, and which one might willingly; difficult if one attempts to find theories to differ from.

When we hear Dr. Arthur Black's production read with its facts and accurate tabulations we are at once disappointed that our own record of gold fillings placed does not indicate so high a percentage; and in Dr. Konzett's essay there is much to confirm

us in the liberal use of and to inspire us to increased effort for a perfect technic in the making of the cast gold inlay.

Discussing these papers it occurred to me to consider the advantage and disadvantage of gold foil and cast gold inlay fillings in comparison as the points have been suggested. For the sake of time I have done this in what might be termed an extended outline.

I. THE GOLD FOIL FILLING.

A. *Advantages.*—

1. Under desirable conditions mechanically perfect fillings may be made.
2. Perfect adaptation to cavity walls.
3. Perfect contour and continuity of surface from tooth to filling.
4. Hardness and resistance to masticatory stress.
5. Perfect retention.
6. Best possible metallic filling for gingival third cavity (5th class Black's classification) as well as buccal and lingual pits in the ten anterior teeth.

B. *Disadvantages.*—

1. Liability to marginal flaws, especially in obscure areas.
2. Difficulty of manipulation in distal fields; as—
 - a. Access and vision in upper and lower molars and many times lower bicuspid.
 - b. Obtaining the proper direction of force to insure adaptation to cavity walls.
3. Long continuous periods of time in placing filling.
4. Absolute necessity for enamel walls supported by dentin.
5. Stress of applications.
 - a. Clamps.
 - b. rubber.
 - c. ligature.
 - d. separators.
 - e. finishing.
 - f. long period of time.
 - g. Strain to periodontal membrane from mal-
leting.

II. CAST GOLD INLAY.

A. *Advantages.*

1. Ease of adaptation.
2. Difficulties not greatly augmented by complex and usual cavity forms or requirements.
3. Protection of cusps from the wedging stress of mastication is easily and thoroughly obtained.
4. Much of the finishing may be accomplished before placing the filling.
5. Contour and contact obtainable without use of the separator.
6. Interproximal space more easily restored.
7. Many frail walls may be used as:—
 - a. Buccal and lingual cusps in bicuspid.
 - b. In anterior teeth, especially third class cavities (Black classification) sound enamel is sufficient since no stress of mastication need be resisted and no damage need be wrought during the filling process.
 - c. In third and fourth class cavities less gold need be displayed as the filling can be inserted from the lingual.
8. In lower anterior teeth, third class cavities may be filled from the labial when the filling is not over conspicuous.
9. Nervous and physical stress, much less on both patient and operator.
10. Eliminates possibility of the danger of splitting off the buccal and lingual cusps of the upper bicuspid from the wedging occasioned by the spread of gold under malleting, and which it seems to me must always place the tooth continuously under lateral tension, that is buccolingually.

B. *Disadvantages.*

1. Distortion of models from shrinkage of wax—which fact seems of small consequence since such difficulty may be overcome by proper manipulation.

2. Shrinkage and expansion of the mold. Dr. Price has given much data on this.
3. Shrinkage of metal in cooling. I am not so sure that the shrinkage is of so little importance as Dr. Konzett would seem to think. To me especially the occluso-gingival shrinkage, seems the greatest detriment to a perfect cast gold filling and the most difficult feature of construction with which we have to contend. The method suggested by Dr. Konzett may overcome the defects of shrinkage, but so far as he told us we can not be entirely sure that it is not considerable theory, and not a proven result.

In filling teeth we are dealing with conditions difficult or impossible to control and not theories entirely. The platinum strips of Dr. Price is another possibility for overcoming shrinkage in the long axis.

From the standpoint of absolute mechanical principles it seems to me the slight overlap in the entire gingival third of a thin plate of pure gold well beveled to a feather edge at the expense of the exterior surface is better than anything that has been brought to my notice. It has several facts in its favor, namely: It gives the bulging contour desired to prevent the bruising at the gum margin.

Decay does not begin under a healthy gum and we never find decay beneath or gingivally of a well fitted band carried well under the free margin of the gum, and the inlay overlap may be made a far less possibility for irritation than the crown band or the 22-karat alloy which Dr. Konzett uses for some of his fillings.

I am so convinced that even the slight oxidation of 22-karat alloy many times is responsible for the inflamed condition of gums that I feel it my duty to use platinum for all crown bands whatever the character of the

crown,—when it is at all possible and advocate pure metals in contact with all gum tissue.

The overlap may be obtained by causing the wax—using a wax quite soft when heated—to flow over the cavo-surface angle between a loosely fitted matrix and the tooth. Another way is to solder on to the gingival third of the inlay, after the inlay has been dressed to contour, a plate of 24-karat gold—36-gauge—slightly overlapping. This overlap may be given a final dressing after cementation.

4. Softness of cast metal. This may be overcome at the contact point by building out solder or 22-karat plate and solder, on the masticating surface we may cut grooves of desired breadth, soldering in a piece of half-round iridio-platinum or clasp wire.

The same method may be used to strengthen the isthmus of the occlusal step when it has not been possible to gain considerable bulk of metal and we fear that it may stretch under stress.

No one can question but that the gold foil filling as set forth in Dr. Black's paper with such a thoroughly mastered technic as he practices and teaches is a superior filling as a filling; on the other hand the cast gold inlay with its technic thoroughly mastered, while possibly not quite the equal of the perfect foil filling as a filling; for reasons not mechanical, many of which I have touched upon, I feel should be given fully as important a place in the procedures of filling teeth. However we must not think for a moment that inlays will give us a royal road to success. Short cuts in dentistry are few and far between. A perfect technic thoroughly executed is necessary for success by whatever method.

DR. J. E. HINKINS:

I do not see why a gold foil operator should be asked to discuss this subject, after two such able essays as we have had this evening. I for many years have been an advocate of gold foil fillings almost entirely, and I think to the full extent that Dr. Black mentioned. As far as cast inlays are concerned, I use them in large restorations, but when Dr. Cruise asked me to discuss this paper, I told him I was not a progressive teacher in the two systems about which so much antagonism has existed, regarding the cast gold inlay and the gold foil filling, and I told him the gold foil filling was as good as it had ever been, and that when a man puts in a gold filling, he is building the highest monument that can be built in dentistry. It is difficult for me to discuss these papers, for the reason that both of them are so fully in accord with my methods of practice, but I prefer using gold foil as much as I can. It seems that along about the sixties, a new era dawned in dentistry. Dr. G. V. Black read a paper at that time on the welding of gold. This was followed by a paper on cohesive gold and the introduction of the rubber dam, and later the Perry Separator. All these things opened up a new era in the filling of teeth with cohesive gold. At about that time there began the contouring of fillings and the preservation of the inter-proximal space, concerning which Dr. G. V. Black read a paper some years ago, which I prized very highly, and this paper did much in impressing upon the dental profession the importance of trying to restore the natural contour of teeth.

Dr. Black said in his paper that gold possesses four qualities; first, adaptation to the cavity walls; second, freedom from shrinkage or expansion; third, indestructibility to the fluids of the mouth, and, fourth, resistance to the stress of mastication, which I heartily indorse.

I have a gold foil filling here that was inserted in 1862 by Dr. M. S. Dean for a Mr. Phillips, whose brother was a dentist. Dr. Phillips had used non-cohesive gold before that, but he had never used the rubber dam nor had he ever used cohesive gold, so he took his brother to Dr. Dean and had his teeth filled with cohesive gold and tin. As I have said, this filling was put in in 1862, and now the man is eighty years of age. This filling shows the high order of workmanship done by men in those

days, so that men like George Cushing and Allport stand out as great pyramids in the dental profession, and I do not believe the dental profession would be on its present plane if it were not for such men as Black, Noyes and others. (Applause.)

Both of the essayists emphasized the importance of cavity preparation, and I thoroughly agree with them that if a cavity is prepared properly the operation is practically half done. Before we had "extension for prevention," I must confess I did not know how to prepare a cavity for a filling as it should be done, but I have learned since that time how to do so, and I feel I have reduced my own labor one-third since then, and in my own office I am satisfied that in eight-tenths of the cases I can prepare the cavity and insert a gold filling quicker than I can an inlay, and feel very much better about it. I feel all right when I make an inlay, but when I come to the cementation, it is something else. It has been emphasized by Dr. Black that every dentist should be able to make an examination of a cavity and lay out the instruments necessary to prepare and fill it, finish and see the operation completed. That is paramount in every good operator, it makes no difference what kind of a filling he puts in; he should see the finished result before he inserts the filling and before he begins it.

The malleting of gold seems to have a peculiar property. Some dentists claim that the malleting of gold is similar to the tempering of steel, but in my judgment there is no comparison because in steel you add the percentage of carbon, but in the malleting of gold we do not add any carbon to it. It is a matter of condensation and some physical change. Right here is a law of physics of which the dental profession knows very little at present.

The tables presented by Dr. Black were very instructive to me, and the more I study them the more I like them and the more I get out of them. It is only about eight years since the advent of the cast gold inlay. Before that time Dr. Ames and Dr. Swasey worked along the line of burnished inlays. I can make a gold inlay as well as I can put in a gold foil filling, but when I come to set the gold inlay and have to fall back on cementation, all the wind is taken out of my sails. I have spent many hours experimenting with cements, and I must confess I do not know very much about them.

I will tell you a little incident that occurred last night before

the class. The Professor of Physiology in the University of Chicago had been explaining nitrogen in nitrogenous substances and its combining power. When I studied chemistry nitrogen balance was made by combining one three and five, but now it is reckoned as five all the time, and these two bonds of union, they claim in marriage, combine within themselves and it leaves nitrogen three, or we have a double marriage and it leaves it one. When he explained that point to the class, a member of the class said, how about glacial phosphoric acid. He said, glacial phosphoric acid does not combine in a single atom, but in a molecule. There must be two atoms of phosphorus, the atom of phosphorus is five, and these two atoms in combining, made a molecule to combine with each other twice, that is, they have two marriages. Then it leaves six bonds of union or hooks out to combine with something else. Another member of the class then said, "We have two affinities and six hooks to combine with. Somebody is looking for trouble." (Laughter.) And that is the condition with cements today. When we mix glacial phosphoric acid with oxid of zinc we have two affinities and six hooks looking to combine with something else, and that is why we do not get better results with the oxyphosphate of zinc. We do not know how to work it.

In sizing up the situation, it seems to me that the dentist is the architect, the contractor, the builder, and the decorator, and the success of each individual cavity depends upon his honest judgment and his honest work.

DR. JOHN E. NYMAN:

I am sorry I did not hear all of Dr. Conzett's paper, because I recognize him as one of the ablest authorities in the matter of the cast gold inlay.

With reference to the question of shrinkage and warpage of gold inlays so they do not fit the cavities as accurately as they should do, that may be due in a measure to the technic of the operator rather than the materials. For instance, I believe it is a great mistake ever to use ice water so that it comes in contact with the wax model from which you are casting your inlay. You can chill it to a point where it will break rather than bend in removal, but when cooled with water which the patient can hold in the mouth it is most effective in chilling the wax model, so that it may be removed safely. It should never be dipped in ice water

before it is invested, but rather dipped in water at a temperature of eighty or ninety degrees. If there is any marked shrinkage or expansion in the wax model used, it will bring it back to nearly the normal shape which it had while in the cavity in the mouth; and, furthermore, in mixing up the investment material, the mixtures should not be made with cold water, but with water at a temperature of ninety degrees. We have eliminated many of our troubles by simply following this little routine. I never have these marked thermal changes of extreme heat or extreme cold in connection with the handling of the wax model.

As to the relative merits of the indirect method and the direct method, I am frank to confess I have seen inlays in the mouth that were made by the indirect method by Dr. Tracy, of New York, and Dr. Knowles, of Chicago, that were as perfect as any made by the direct method, and I have seen fillings made by the direct method, notably by Dr. Orr and Dr. Bryant, who have been with me for many years, and I have had an opportunity to witness their operations, which were as perfect as any inlays that could be made by the indirect method. So I have come to believe there is great merit in both methods. There is quite a difference in the technic, and it is a question of a man mastering the technic of each method and using his judgment as to which one is indicated in the particular case. If a man who has perfected his technic in the use of the indirect method, should make up his mind that here is a difficult cavity to handle by the indirect method, and I will try the direct method I have heard about, he is doomed to disappointment as the cavity is adapted for the indirect method, and he does not know how to proceed to use the direct method to advantage. Both methods have their advantages and inlays as nearly perfect as possible can be made by either of them.

As to the question of resistance to compression, I would like to ask Dr. Black in regard to shrinkage under pressure?

DR. BLACK:

I said there was some shortening.

DR. NYMAN:

Many of these laboratory experiments are inconclusive as to actual conditions in the mouth, because of the fact they are not carried out under identical conditions that exist in the mouth. To

begin with, there is no such a thing as two hundred and fifty pounds of pressure. The pressure is relative. As a matter of fact, instead of there being steady compression, the average pressure on the tooth is more like hard burnishing, and nothing else, and usually the burnished surfaces are harder than the other surfaces of the inlay which have not been under pressure. Furthermore, I think it has been demonstrated that the human jaw can exert a closing pressure of five hundred pounds. Is not that true?

DR. BLACK:

Three hundred and forty pounds.

DR. NYMAN:

If my memory serves me right, I think it has been demonstrated by actual experiment in chewing up food that the teeth only require forty to eighty pounds of pressure to chew up thoroughly any of the foods people are accustomed to eat; but that does not include the cracking of nuts with the teeth. The ordinary food requires a pressure of forty to eighty pounds. Heat and saliva materially soften food products, and no such pressure is given it as has been used in laboratory experiments. So far as that is concerned, the value of the experiments is not as great as would be indicated. I still think that while our gold inlays may not resist as great an amount of compression as a perfectly malleted and condensed gold filling may, still, on the other hand, for all practical purposes, it will.

Again, there is one thing I want to say from a deep conviction, and not in any sneering or critical sense, and that is this: I believe the average gold inlay will better preserve a tooth and preserve it for a longer period of time than the average gold filling will. Furthermore, there is more definiteness and certainty of technic in operation by the average gold inlay than by the average gold filling.

DR. E. M. S. FERNANDEZ:

I am one of those who believe that the process of gold casting in dentistry has come to stay, and for many years to come. Judging by the way some men talk, it would seem that the making of a cast-inlay is an easy piece of work, but in my experience I have found that cast work of any kind made properly throughout is not an easy proposition. I sincerely believe that if a skilful workman would confine himself exclusively to cast work, in the long run he would serve his patients better than otherwise. I can not take my seat without recalling the fact that we owe for this work to Dr.

William H. Taggart a depth of gratitude which none of us should ever forget.

DR. C. E. BENTLEY:

The cast-gold inlay seems to be on trial tonight. I rise simply to emphasize some points in the technic as outlined in the excellent paper by Dr. Conzett. Someone has said tonight that a perfect gold filling is a very rare thing. The exhibit Dr. Hinkins made of that filling that had been in a cavity for fifty-two years is interesting, but we must take into consideration the environment, the physical condition of the patient, the saliva, the immunity from caries of the individual, and the lack of knowledge that Dr. Hinkins himself said he did not have about "extension for prevention," and in spite of all these limitations, this individual has had this filling to remain in his mouth intact and uninjured for fifty-two years. We all know that is rare and exceptional. We all know there might have arisen constitutional or local conditions at any time that would have made the individual susceptible to caries, and this filling would have failed as other fillings have failed. But with reference to the cast-gold inlay, I want to emphasize this one thing: The cast-gold inlay is a more humane method of filling and saving teeth than anything that has come to our present knowledge, but it has been abused. It has been misunderstood, and it is not properly practiced. I can only refer to the great master's words (Taggart) when I speak to you about the technic, namely, that if we follow the technic of Dr. Taggart, as he originally gave it to us seven years ago from this platform, we will not have the trouble with these cast-gold inlays, and we will not hear depreciative statements made in every discussion we have had recently in the literature about the failure of gold inlays. There is subtleness in the mastery about the technic of a gold inlay, as Dr. Taggart gave it to us seven years ago, that is poorly and little understood by the average man in the profession today, as I see it. It has been thoroughly covered in Dr. Conzett's paper, and that paper is susceptible of deep study, and I predict that if we follow the technic as laid down in Dr. Conzett's paper we will not hear so much of the failures of the gold inlay.

DR. DON M. GALLIE:

I wish to say a few words in connection with the discussion of these excellent papers. I do not think the statement should go by unchallenged that the comparison made in regard to the average

gold filling and an average inlay is at the expense of the gold filling.

After listening to these papers, it simmers itself down to the limitations in each line of practice. I would take exception to Dr. Conzett's practice of inserting inlays, if I may judge by the models he passed around tonight, because from the models of cavities I should say those cavities could have been filled better with gold. I believe that the average proximal cavities in anterior teeth or the average occlusal cavities in bicusps and molars can be better filled and more quickly, and with no great discomfort to the patient, with gold foil.

Dr. Bentley has advised us to be careful of the technic in making the inlay restoration. We need to be careful and thorough in technic for foil restorations. We can not be indifferent to cavity preparation or the manipulation of gold foil, any more than we can be indifferent about the forcing of wax and contouring and carving and restoration of the surfaces of the inlay. I have long thought there was something unreliable about the retaining medium of our inlays. I am glad to hear Dr. Hinkins speak of cement as fickle and as a chemical polygamist. Any man who takes two women or any woman who marries two men will have difficulty in keeping the house in order. (Laughter.) But this question of the relative merits of gold foil and the gold inlay is apparent to all those who are engaged in operative work. Each has its limitations. There is a big place for the foil restoration and a big place for the gold inlay.

There is another feature about the gold inlay restoration and the lack of proper regard for the technic that has been overlooked. In making proximo-occlusal foil restorations we are desirous of restoring the interproximal spaces and the original mesio-distal diameter of the tooth. If it has to be done by gold foil, there must be sufficient separation before you can manipulate the foil so as to restore proper contour and contact. When it comes to the inlay restorations, and we see them frequently, where there has not been time taken to get the separation necessary to restore the tooth to its mesio-distal diameter, it is easy to squeeze in wax and have the patient bite down upon it, and get proper adaptation without consideration of the contour and contact. That is one of the things that go against the inlay restoration because there is a tendency on the part of the profession not to pay the heed and attention they should to this particular detail.

I give way to no one in this audience in my appreciation of the merits of the gold inlay, not only in the saving of teeth, but the advantage of comfort for our patients. But we cannot overlook the fact that gold foil has stood the test of time, and the case cited by Dr. Hinkins is not an unusual one because those who have been in practice for twenty years have found many cases that would bear out what he has said.

The impression should not be given here tonight that all restorations should be made by the cementation of the material.

The younger men should not allow their fingers to lose their cunning in the handling of gold foil and in the adaptation that is necessary. You can mallet a filling as hard as you like, but if you have not adapted it to the walls of the cavity it will not preserve the tooth. A cavity filled with foil, perfectly adapted, condensed, with force in the right direction and perfectly finished, will stand the test of time and not suffer in comparison with the cemented restoration.

DR. CLARENCE H. WRIGHT:

It has been said that the gold inlay is in its infancy. In 1903 I read a paper before this society on the gold inlay, in the last paragraph of which I said something like this: "In my experience of some eight years I am forced to the conclusion that a cavity properly filled with a gold inlay is better protected than by any other method." I still believe that, and while I use the cast principle of making inlays, there are old methods by which the dentist can put in as good gold inlays as it is possible to insert today under modern methods." There are so many qualities of inlays that we are in despair of bringing them in at one time, but the stress of mastication has never been a problem. They have stood the test, and there would be the question of requisite sealing of the cavity by means of a perfect gold inlay under which there is a layer of cement. I repeat, that the gold inlay fills the cavity better than it is possible to do so by any other means.

DR. J. V. CONZETT, Dubuque, Iowa (closing the discussion on his part):

First, I want to thank the society kindly for the reception of my humble efforts; and, in the second place, I do not want you to understand that I only use gold inlays. I give first place to no one in my regard for the gold foil filling. I have not thrown away my

gold foil pluggers by any manner or means, and I do not want Dr. Gallie to think so. Some of these cavities I have prepared for inlays are in my practice filled with the gold foil filling, and if it were possible for me to take up time to give a differentiation of the places in which I would use a gold foil filling, and in which I would use an inlay, I would do so. However, I will say this, that I believe that we never ought to sacrifice any more sound tooth tissue than it is necessary for us to do in order to save that tooth. If we have to sacrifice more tissue to make an inlay than to make a filling, we should make a filling, and I believe in nearly all cases of proximal fillings in anterior teeth we should use foil, and as Dr. Black has said, many of these cavities should be filled with foil and not with an inlay.

My subject was the preparation of cavities, and I illustrated the form of cavity preparation that should be used if we are to employ an inlay in these places. It has been stated that the men who have trouble with gold foil fillings are the men who cannot make a decent gold filling. That may or may not be true, but I do know this, that the majority of gold fillings are not properly made, and as I said in my paper, a poor gold inlay is better than a poor gold filling.

I wish to thank Dr. Black for his series of experiments. I supposed the use of five per cent. alloy of platinum was all right because some of our metallurgists told us so, but Dr. Black has demonstrated it is not true. I shall not use five per cent. platinum alloy hereafter.

As to chilling of the wax, I like to have the wax at the same temperature from the beginning of the operation until the end. I do not place cold water upon it at any stage.

I have been asked to tell you how we release the elasticity. We release the elasticity by warming the wax while it is in the cavity. Some one has said that when Dr. Taggart gave us his paper a number of years ago he gave us a perfect method of making an inlay. I think that is absolutely true. If we follow the method he used at that time we would have our inlays as near perfect as it is possible for us to make them. Many of us have departed from the gospel he preached at that time, and it is necessary for us to have a revival and take up some of the things he told us.

Dr. Price tells us that when wax is compressed it has a ten-

dency, because of its elasticity, to assume its normal shape, and when it is taken out of the cavity there is a tendency for it to assume its normal shape because of the slight distortion of the wax. If it is a simple cavity there is not sufficient distortion to show that. In releasing the elasticity of the wax it is thoroughly compressed into the cavity and then syringed with warm water at a temperature of 120°. After it is forced into the cavity, I go all over the surface of the wax with my burnisher, which is warm, and finish it. After allowing it to cool to the mouth temperature, not using ice water to chill it, I carefully remove and invest. I usually invest inlays as quickly as possible and not allow them to lie around a long time after. I have distortion in that way.

The method of overcoming the shrinkage of gold is by making a cavity so that the inlay will fit into the cavity. Then take a slight shaving from the inside of the wax model, and when the gold is malleted into place the inlay will fit firmly in the cavity, as demonstrated in the model. That is not original with me, but it is the work of Dr. Baker of Davenport, who has done a great deal along this line of work. He taught us much about the cast gold inlay. I am not giving you many things of my own working out; I have simply taken the things that the masters in the profession have taught me and have brought them to you. There is no royal road to success. You cannot do slipshod work and make a perfect inlay or a perfect gold filling. It means time, it means practice, it means hard work and conscientious work, but I believe the man who will conscientiously strive to perfect himself along the line of operative dentistry, whether in making gold fillings or inlays, and conscientiously follow the teachings of the men who have gone before, will make operations that will be a credit to himself and a joy to his patients.

DR. ARTHUR D. BLACK (closing the discussion):

It may have seemed to some in this audience that these papers have been presented with the idea of there being some antagonism between the two subjects. Personally, I cannot see it. We have to recognize two good methods of operating. The idea of this program tonight, as I have understood it, has been to emphasize as well as we could some of the more important and valuable matters in connection with each of these two methods. It was not my idea, and I am sure it was not Dr. Conzett's, that we were here to discuss

medium or poor methods of operating. I do not believe that is the purpose of a dental society meeting. The purpose of the meeting was to present the best in each method and thus inspire men to do better than they have been doing. It is not an easy thing to put in a good gold foil filling, and it is not easy to put in a good gold inlay. I hope that the papers we have presented will have some effect in improving the technic of all of us in both of these methods.

I have often thought that the course of the dental profession might be well illustrated by a zig-zag streak of lightning. We are over here one day, and over there the next, jumping from one thing to another. I want to suggest that it would be much better for all of us if each individual would make his own course a little less zig-zag; make the bends more gradual, and to keep a little more nearly in the middle of the road.

AMERICAN DENTAL SOCIETY OF EUROPE.

FORTY-FIRST ANNUAL MEETING, HELD AT PARIS, JULY 30-AUG. 1,
1914.

DISCUSSION OF THE PAPER BY DR. CHIAVARO ON THE ENTAMOEBIA
BUCCALIS.

(This paper was printed in the December number.)

DR. E. C. KIRK:

Said he would hardly have the temerity to speak upon the subject were it not for the fact that just before he left America he was called up on the telephone by Prof. Allen J. Smith, the Professor of Pathology and Topical Diseases in the Medical School of the University of Pennsylvania, who said: "If I treat seventeen cases of pyorrhea alveolaris with medicine, and nothing else but medicine, and sixteen of those cases get well, what would you say about it?" He replied, "I should say that it was a miracle." "Well," he said, "come over and see me; I want to talk about it." He went to see Dr. Smith and found that one of the assistants in the Department of Histology in the Dental School, Dr. M. T. Barrett, had gone over to the pathological laboratory in the Medical School and asked to be given a piece of pathological work to do. Dr. Smith suggested to him to take up the subject of pyorrhea, but Dr. Barrett demurred, as he considered the subject had been investi-

gated from all sides, and the more it was investigated the less was known of it. However, he said he had been looking over the exudate from a number of pyorrhea cases and had found some interesting protozoa that it might be worth while examining. In the seventeen cases examined he found the presence of the *entamoeba buccalis*. In view of the constant occurrence of the protozoa, Professor Smith suggested it might be worth while to test in a therapeutic way the action of *ippecacuanha*, because of its known lethal action upon the amoeba which was the cause of dysentery, and to their surprise they found that after a few applications the inflammatory activity in the cases of pyorrhea subsided. They had some cases of pyorrhea associated with glandular enlargement of the neck and considered that possibly the glandular difficulty might be a metastatic inflammation due to infection from the pyorrhea exudate, and in those cases the glandular enlargements subsided. He went over the exudates with Dr. Barrett and Professor Smith, and saw the amoeba, both living and stained, and found them as described by Professor Chiavaro. He did not wish to convert the discussion into one on pyorrhea *alveolaris*, but it was significant that the applications in those cases had given such wonderful therapeutic results. Whether pyorrhea was in any way associated with the pathogenic activity of the *entamoeba buccalis* was, of course, an open question, because, as Professor Chiavaro had shown, the phagocytic action of the protozoa might have a very important usefulness in auto-disinfection of the mouth. Moreover, studies of the action of emetin in the treatment of dysentery showed definitely that *ippecacuanha*, although it had an action on the *amoeba coli*, was not a specific. When he arrived in Europe he went to Burroughs and Wellcome's and procured a supply of emetin hydrochlorid and wrote to Dr. Prinz, asking him to have it tried in Berlin, and several men in England and Germany had been using it with uniformly favorable reports. He did not mean to imply that the amoeba was the specific exciter of pyorrhea infection, but he presented the fact that the use of emetin had, without any other treatment, produced prompt and efficient results in pyorrhea. The work which Professor Chiavaro had done enabled the subject to be taken up intelligently and earnestly. In his report in every case of pyorrhea the protozoa had been demonstrated to be present. Even the exception Dr. Chiavaro put forward was one in which the protozoa were eliminated temporar-

ily by the use of an inorganic acid medium. Another interesting fact from the clinical point of view was that in carious cavities in which there was an acid action the protozoa did not exist.

DR. C. F. BÖDECKER:

Congratulated Professor Chiavaro on the great amount of work he had done. The pathogenic action of the *entamoeba buccalis* was interesting in that it did not flourish in an acid medium. If it was found to have no connection with pyorrhea it was possibly because the mouth was not disinfected thoroughly. In nature there were many birds that removed insects, and it might be there was a similar thing going on in the mouth.

DR. MENDEL JOSEPH

Said that when Dr. Chiavaro showed him his studies on the subject his first idea was that, although it was naturally very interesting for any one to know the different inhabitants of the mouth, it was hardly of practical interest to the dentist, and it seemed really a question for the laboratory. The work had been beautifully carried out from all points of view and Dr. Chiavaro had brought forward real facts gained by study. That was important, because very often men tried to form conclusions that extended beyond the facts they had studied. He was glad now to learn from Dr. Kirk that this study was of considerable importance, not only from the biological point of view, but from the practical point of view; in fact, he had been told that Dr. Kirk considered the amoeba as a specific organism in pyorrhea, and that assumption should lead to a very careful study of the *entamoeba buccalis*. The absence of caries might be explained by the alkaline condition of the mouth, that alkaline condition being just the condition for the development of the *entamoeba*. He thought Dr. Kirk's communication was of very great importance.

DR. KIRK

Wished to emphasize his point of view that he did not regard it proven that emetin was a specific for pyorrhea alveolaris or a specific for the destruction of the *entamoeba buccalis*. It had been shown very definitely by researches upon dysentery that emetin was not a specific there, that it was also destructive of bacterial forms as well. He was not sure that pyorrhea was due to a specific infection.

DR. A. PIPERNO

Asked Professor Chiavaro if he had made researches on the edentulous mouths of old people or in the mouths of young children; also whether he had studied the *entamoeba buccalis* in conjunction with other bacteria in the mouth; also whether he made the studies in the mouth day by day or left the mouth clean for a time and then continued the study; also did he endeavor to make a culture in the laboratory by bringing the *entamoeba* from one mouth to another mouth where *entamoeba* were not found?

DR. VALADIER

Said that several weeks ago he had received a paper from Philadelphia giving him the results of Dr. Barrett's work and he immediately called up his collaborators at the Institute and started to make investigations on the same lines. Finding that emetin was a drug with which Dr. Barrett had been working, they immediately studied emetin to its full extent and found it was rather a dangerous drug. No instruction being given as to how it was to be used, it was tried on a monkey in which pyorrhea had been developed. The emetin was applied to the gums at 4 o'clock in the evening and the monkey was dead at 9 o'clock next morning.

DR. PRINZ

Said emetin could be procured in tabloid form in the necessary quantities, one-third of a grain, from Burroughs, Wellcome & Co. The tabloids were dissolved in distilled water, one in two cubic centimetres of water giving a 1 per cent solution. That solution was applied by means of a blunt hypodermic syringe, sufficient to fill the pocket. The pus was first pressed out, the pocket filled and covered with vaseline or some other material to prevent the emetin flowing out. The patient was left undisturbed for two days and then the treatment repeated. With regard to the poisonous nature of emetin, the question whether the monkey died from emetin was not very clear. As a matter of fact, as much as half a grain could be injected into the tissues and had been so injected in tens of thousands of cases in the Philippine Islands with perfect success; he had not heard of a single death. It should be remembered that emetin was an alkaloid of ipecac, and if a patient accidentally swallowed some of it he might feel inclined to retire for a short time. Emetin produced emesis when given through the

mouth and therefore had no action. Where emetin had been tried in Berlin it had been remarkably successful. The treatment should be repeated every other day for three or four days. He had spoken with a man who had spent a great deal of time on the bacteria of the mouth and had been told that for ten years he had not been able to show such a thing as an entamoeba, but as a matter of fact he had not looked for it.

DR. CHIAVARO

In reply, said he did not look into edentulous cases because there was no place where material for study could be found except in the saliva. Neither had he dealt with the mouths of young children. It was difficult to make cultures of the entamoeba because if they were not kept at the proper temperature they died. He extended his sincere thanks to those who had taken part in the discussion.

DISCUSSION OF DR. EPPRIGHT'S PAPER, "TECHNIC OF CONSTRUCTION FOR COMBINATION GOLD AND CONTINUOUS GUM DENTURE."

DR. GEORGE WEBSTER (Berlin)

said Dr. Eppright had a happy faculty of opening up new channels. His restoration along mechanical lines had borne considerable fruit and the work he was now engaged upon would no doubt produce some new conveniences for the laboratory. For two or three days he had been loafing around Dr. Eppright's laboratory and had come to the conclusion that if the Doctor was given a piece of board, a piece of string, a tin can and a jack knife he would make an automobile! The work had impressed him very much and Dr. Eppright had devised a new kind of plate. Dr. Eppright had told him that he would quite as soon make a plate as make a rubber attachment on a plate. Many men found difficulty in obtaining any assortment of continuous gum teeth in Europe, and it was an advantage that the teeth used by Dr. Eppright were diatoric teeth which could be easily obtained. No heat was used on the gold plate after it was once swaged, so that there was no danger of warping.

DR. CUSTY

asked Dr. Eppright what porcelain he used for attaching the diatoric teeth. It had been his experience that they were very low fusing

and therefore it was necessary to use a low fusing porcelain for their attachment.

DR. G. B. HAYES (Paris)

said Dr. Eppright would give a Clinic on Saturday and would be pleased to answer any questions regarding technique.

DR. CAPON

said that in America there were many beautiful forms of diatoric teeth on the market which would stand considerable heat.

DR. WEBSTER

said it was possible to use aluminium or any base except rubber.



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EDITORIAL.

DEDICATION OF THE FORSYTH DENTAL INFIRMARY FOR CHILDREN.

This event took place in Boston, November 24, 1914, and according to all reports it was a very imposing affair. The occasion was graced by the presence of the Governor of Massachusetts, the Mayor of Boston, the President of Harvard University, the President of the National Dental Association, Mr. Thomas Alexander Forsyth, one of the founders, and many other distinguished and learned people. During the day about 4,000 persons visited the institution and there were 1,500 at the dedicatory exercises.

Nothing like this in the way of a dental charity for children has ever been approached. It was founded by John Hamilton Forsyth and Thomas Alexander Forsyth in memory of their brothers James Bennett and George Henry Forsyth. Of these four splendid brothers only one now remains, the distinguished gentleman who graced the occasion at the dedication of the Infirmary. It must have been to him a source of great gratification to witness the culmination of so worthy an enterprise founded by his family, and one to be indissolubly connected with his name for all time.

The dedicatory exercises were conducted by Dr. Edwin T. Darby of Philadelphia and consisted of addresses by His Excellency David I. Walsh, Governor of Massachusetts, His Honor James M. Curley, Mayor of Boston, Charles W. Eliot, L.L.D., President Emeritus Harvard University, Thomas Alexander

Forsyth, Milton J. Rosenau, M.D., Professor of Hygiene, Harvard University, Donald M. Gallie, D.D.S., President of the National Dental Association, Edward McSweeney, Trustee of Boston Consumption Hospital, and William J. Gallivan, A.B., M. D., Commissioner of Health, Boston, and Chief of Bureau of Child Hygiene. The presentation of the key was made by Edward T. P. Graham, architect, and it was accepted by John F. Dowsley, D.D.S., President of the State Board of Registration in Dentistry, and Trustee of the Forsyth Dental Infirmary for Children. In addition to this there were choruses by the Boston school children, a very appropriate exercise in view of the fact that the institution was dedicated to their benefit.

The inauguration of this Infirmary constitutes a landmark in dental philanthropy. Aside from the worthy motive behind it the actual carrying out of the enterprise has been done in a most sumptuous manner. To go into a description of the building and its equipment at this time is uncalled for, except to say that it has already cost nearly a million dollars, and the money seems to have been exceptionally well spent. This with the munificent endowment for maintenance amounting to an additional million places the institution on a footing which will mean much not only for the children of Boston but for the movement of oral hygiene the world over.

To men of the largeness of heart of the Forsyth Brothers the world owes much for its betterment, and in this particular instance there is the additional distinction attached to pioneering in a new field. We wish to extend our congratulations to all concerned in the development and consummation of this splendid charity.

ANOTHER STEP.

At the McGill University, Montreal, Canada, the corporation has just approved a recommendation made by the Medical Faculty to include in the physical examination of all students entering the university an examination of the mouth and teeth. This we believe is the first instance where the governing body of a leading university has thus recognized the importance of mouth conditions, and we think we see in this not only the

significance of the move itself but also the splendid influence on the Medical Faculty and the Corporation of the present head of the Dental Department, Dr. A. W. Thornton. Step by step the profession seems to be coming into its own.

A CORRECTION.

The discussion of Dr. Chiavaro's paper in our December number was so full of errors that we are reprinting it in the proceedings of the American Dental Society of Europe in the present issue with these mistakes corrected.

THE EDITOR'S DESK.

ABROAD IN WAR TIMES.

Another Vacation Story.

(Continued from the December number.)

VERSAILLES.

One day we drove out to Versailles, halting on our way at Saint-Cloud, the place where Napoleon married Marie Louise of Austria after brutally repudiating the gentle Josephine. During this drive we saw a grim reminder of the Franco-Prussian war in the form of a huge shell imbedded in the wall of a house just beneath the balcony. It had penetrated nearly half its length into the solid masonry leaving radiating cracks which were being gradually filled with moss through the mellowing influence of the years. War is a grim reality in Europe as I shall have occasion to enlarge upon later in these articles.

Versailles is pronounced "Vairsii," and Saint-Cloud is called "Sawn-Cloo." The palace of Versailles was begun by Louis XIII in 1632 but it did not reach its greatest grandeur till the reign of Louis XIV which began in 1643. This King lavished his wealth on the place to the extent during his reign of about 60 million francs, or twelve million dollars. In 1682 it became the permanent residence of the court and at the death of Louis XIV in 1715 it went to Louis XV, whose mistress,

Madame de Pompadour, though disastrous in her influence and most wasteful of money, was instrumental in fostering the atmosphere of art and literature in the palace, and who even induced the King against his will to take part in a ballet though he had always detested such things. It was chiefly through her that Voltaire wrote plays especially for the Theatre of Versailles, she herself taking a leading part in their performance.

But the culmination and supreme catastrophe of Versailles as a King's palace came in the reign of Louis XVI, who with his good Queen Marie-Antoinette, were to receive the full brunt of the Revolution. On October 5 and 6, 1789, the Royal Palace was



The Court of Honour of the Palace of Versailles

invaded by the people of Paris and the King and Queen put to flight, after which Versailles was no longer to be the abode of the Kings of France. The Royal furniture was sold by the *Convention Nationale* which was the Revolutionary Assembly that proclaimed the First Republic, and sentenced Louis XVI to death.

From 1804 to 1814 Napoleon I restored the Palace in various parts, and other improvements were made by Louis XVIII and Charles X, but it was Louis Philippe who from 1830 to 1848 did the most to reinvest the Chateau with some of its former

splendor. He planned the Grand Museum and the galleries of Sculpture and Art and was instrumental in housing more than 4000 paintings and portraits, about 1000 pieces of sculpture, and 5000 other objects of art. In all he spent nearly one million pounds sterling on Versailles.

The chief event of interest to Americans in recent years was the inauguration on August 18, 1910, of the statue of Washington, the gift of the State of Virginia. It is located in the south wing of the Palace in the vestibule Napoleon, and if one wants to feel at home amid all the vastness and strangeness of this antique and sumptuous old palace, all one has to do is to go to the south wing and gaze on the statue of our first President. The sympathy existing between France and the United States has always been close and cordial, dating back to the day when LaFayette set sail for America to aid the immortal Washington in his struggle for independence, on down to the time of our great internal struggle when the stability of the Union seemed to hang in the balance. It was then that the Emperor of France sent our own Dr. Thomas W. Evans, the Court Dentist of Paris, to interview Lincoln with the result that Dr. Evans took back to the Emperor the assurance that the Union must eventually win, and that the course for France to pursue was to keep off her hands.

Somehow as I walked through room after room of this historic and aged Palace of Versailles I was impressed more with the memory of two figures connected with it than of all the others together. To me Louis XIV and later on Marie-Antoinette, wife of Louis XVI, stand out as the chief characters of interest in the entire scene. Louis XIV gave a status to Versailles more surely than any other man. His statue today appropriately guards the entrance to the Palace in front of the Royal Court, and it is his initials and his monogram that are on most of the decorations and insignia of the interior of the Palace. We were told that some of the tapestries ordered by him are still hanging on the walls and we saw dates on a few of them running back to the 17th century. We visited his bedchamber and also the King's Council Chamber adjoining it, and I wondered as I looked upon this room how many important conferences had been held within its four walls, how many

momentous decisions had been reached there, how many secret sessions. And I went back in imagination to those dark days of 1709 when the wars were going against Louis XIV and he was obliged to send from Versailles to the mint his silver throne and various precious pieces of plate to meet the expenses of the war. Some kings are fortunate enough to die in time to save themselves from misfortune, but most kings are fated to suffer disaster and defeat sometime in their career—usually in their latter days.

The marvelous gardens of Versailles were mostly due to the influence of Louis XIV who appointed the famous Master

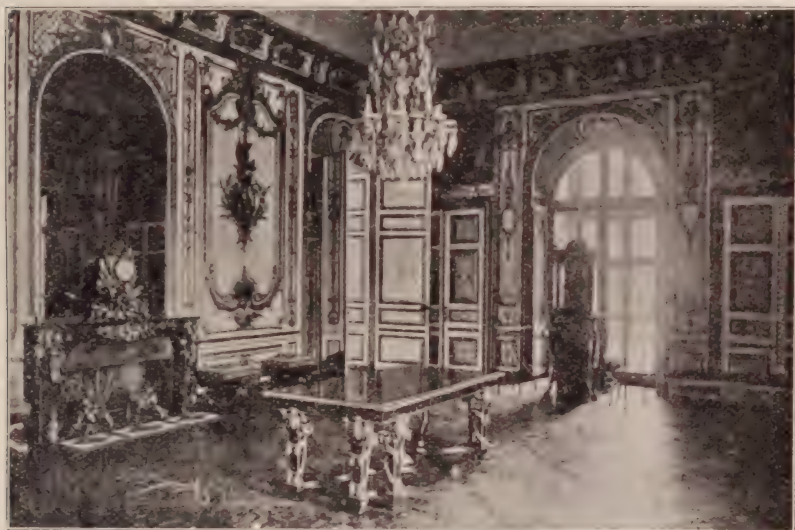


Louis XIV

Gardener LeNotre to superintend the work at Versailles as he also did the Gardens of the Palace of Fontainebleau. LeNotre who lived from 1613 to 1700 was the son of the superintendent of the Royal Gardens of the Tuileries, and his superb achievement at Versailles is the wonder of all who visit there. As an instance of the devotion of this man to his master it is recorded that on one occasion when Louis XIV was being promenaded in the Gardens of Versailles in an invalid chair he chanced to see Le Notre, who was then over 80 years of age, and made him accompany him in a chair. The old gardener was so overcome that he exclaimed: "Oh! if my poor father were alive, and could

see his poor son promenaded by the side of the greatest king on earth, it would be my supreme joy."

And the other character, that of Queen Marie-Antoinette, interwoven with some of the most stirring events in the history of France—it was her personality which impressed me most and clung to me longest after my visit to Versailles. She was the beautiful queen of Louis XVI, and to her fell the fate of sharing his misfortune when the revolution of 1789 swept them from the throne. Indeed the queen narrowly escaped personal violence from the mob on the night of October 6, when they



Council Chamber of Louis XIV—Versailles

swarmed into the court yard and even ascended the marble staircase leading to her apartments. A guard who was watching shouted: "Sauvez la Reine; ses jours sont en dangre" ("Save the Queen; her life is in danger"). The chambermaids had opened the door but on hearing the guard they promptly shut and locked it. The guard was knocked down and left for dead. The chambermaids rushed to the Queen's bedchamber and Marie-Antoinette rose and scantily attired ran down a passage communicating with the King's apartments where she took refuge. Contrast those days with today, and despite all the horrors of latter-day warfare, we must yet believe that the world is grow-

ing better. No queen of today would ever be attacked by a mob and threatened with personal violence.

We saw at Versailles the Queen's bedchamber. Three Queens, Marie-Therese, Marie Leczinska, and Marie-Antoinette occupied this room and all the children of Marie-Antoinette were born here. We saw also the smaller and cozier apartments tucked away unobtrusively near the inner court where the Queen most loved to remain when in the Palace and in fact where she spent much of her time while there. We saw also the marble staircase, not far away, up which the frenzied mob precipitately charged that terrible night, and I thought as I gazed at the scene, of the instability of thrones and of the unreasoning fury of the mob. Little did I think that a few days later I was destined to see the mobs of Paris in full force upon the streets, to watch their movements and hear their cries. But more of this later.

Probably Marie-Antoinette was seen at her best in her domestic role at the miniature Palace of the Petit Trianon adjoining Versailles which the King had presented to her. She had an innate contempt for the silly vanities of Court Etiquette as carried out at Versailles, and would come to the Little Trianon to rest herself and mingle in a most informal way with her friends. It is recorded that she was to be seen at the Little Trianon during the summer months in a plain cambric muslin dress and a straw hat—a very excellent example, by the way for a real Queen to set. And yet in 1783 when Madam Vigee-Lebrun painted a picture of Marie-Antoinette in a light gown of white muslin it created a scandal at the Salon, and had to be withdrawn on the ground that so simple a dress was incompatible with Royal Majesty, and that the example set by the Queen would ruin the silk industry of Lyons. Verily—verily, it is difficult for a Queen to please. In six short years from this they were trying to murder this same Queen because they wanted to do away with the pomp of Majesty and create a Republic, and in ten years they made her a widow by beheading her husband, and followed a couple of months later by killing the Queen herself.

It has been charged that Marie-Antoinette, being an Austrian, had little sympathy with the French—it is even

charged yet that she continually shocked the conventions of the Court and had little sympathy with her surroundings. Possibly this is true. It is also charged that during the revolution she was secretly corresponding with the courts of Vienna and Berlin urging them to declare war on France—using as her argument the contention that if this were not done the revolution would spread to every country of Europe. Well—what of it? Would not you or I have done the same thing if we had been in her place and knew as much as she did? Marie-Antoinette could not help being a Queen, and considering her training and traditions I think she did exceedingly well. In any event she surely did not deserve to be swept into the maelstrom of unreason,



Queen Marie-Antoinette

and included in the bloody massacres which disgraced those days. It is a sad chapter in French history.

I came out of the Palace of Versailles with my head drooping a bit, and my spirits saddened; only to be brought out of my reverie by one of the most beautiful vistas my eyes have ever gazed upon. The gardens at the rear of the Palace of Versailles have been so often described that I shall not attempt it here, except to say that for extent and artistic beauty they are incomparable with anything I have ever seen. Some have

charged that they were rather artificial and too symmetrical, but it should be remembered that they date from 1662 to 1688 and are in accord with the fashion in the days of Louis XIV. I am not inclined to suggest any change in those gardens, with the possible exception that I should like some of the beautiful marble and bronze statues back again which graced it in the days of Louis XIV. There were an almost endless number of these as may be imagined when it is learned that under the leadership of two distinguished designers—Mignard and Le Brun—about one hundred sculptors were employed. But it is a vain hope to wish them back, because most of them have been



Gardens of Versailles

destroyed. I have previously remarked that the Parisians seem to be always tearing down and restoring, and this is apparent at every turn of their history. And yet it is something to say that they have preserved the turf and the general plans of these gardens for more than two centuries. I fear that if Versailles had been that near Chicago, the gardens would have been cut up into town lots long ago, with free excursions every Sunday till they were sold. All honor to Paris and to France when compared with this.

C. N. J.

(To be continued.)

BOOK REVIEWS.

LOCAL AND REGIONAL ANESTHESIA, INCLUDING ANALGESIA. By Carroll W. Allen, M. D., of Tulane University, New Orleans, with an introduction by Rudolph Matas, M. D., of Tulane University, New Orleans. Octavo of 625 pages, with 255 illustrations. Philadelphia and London: W. B. Saunders Company, 1914. Cloth, \$6.00 net; Half Morocco, \$7.50 net.

To recent books on local anesthesia it would seem as if there were no end. This is the fourth volume on this subject which the reviewer has been permitted to examine in the past few months, and the rapidly growing literature on the topic is indicative of the increasing interest in this method of practice. The present author is evidently an expert in the use of local anesthesia, and he has a clear way of presenting his subject to the reader. An especially useful chapter is the one on "Local Anesthetics," in which he considers in some detail the characteristics of the various drugs used for this purpose, such as cocain, eucain, akoin, holocain, tropacocain, stovain, alypin, novocain, chloretone, orthoform, nirvanin, anesthesin, subcutin and propäsin. Although the author makes many acknowledgments, both in text and illustrations, to previous authors, notably Matas, Braun, Fischer, yet he lends to this work so much of his own individuality as to make it characteristic and distinctive.

The book will well repay a careful reading by those interested in the subject.

A LABORATORY MANUAL OF QUALITATIVE CHEMICAL ANALYSIS. By A. R. Bliss, Jr., M. D., Ph. G., Professor of Chemistry and Pharmacy in the Birmingham Medical College. Octavo of 244 pages, with working tables. Philadelphia and London: W. B. Saunders Company, 1914. Cloth, \$2.00 net.

The object of this book is to aid first-year students in getting a grasp of the qualitative chemical analysis. It is plainly written and filled with practical suggestions for the student, including the necessary apparatus for laboratory work in chemistry. To make it more helpful blank leaves are interspersed through the text for the student to record his notes. The book will prove a decided aid in college work, and we are glad to commend it for its clearness and systematic arrangement.

SCHUHMAN'S QUESTION COMPEND. A Quiz Compend covering some of the theoretical work of the first year's curriculum at the American Institute of Science. By H. H. Schuhmann, M. D., D. D. S., Chicago, Ill.

This is a little book of 59 pages compiled by Dr. Schuhmann to cover the first year's work done by the Chicago Dental Research Club, under the tutelage of Dr. E. H. Baker. It consists of questions and answers on urinalysis, blood tests, cell life, immunity, food, enzymes, etc., etc.

If this book is an earnest of what this club is doing, and if all this work was covered in one year, it would seem desirable that more of these clubs were formed in the profession and the work extended to a wider field. Dr. Schuhmann has placed his fellow club members under a debt of gratitude to him by compiling this book, which will render a repetition of their work very convenient.

A MANUAL OF DENTAL ANATOMY, HUMAN AND COMPARATIVE. By Charles S. Tomes, LL. D., F. R. S., F. R. C. S., seventh edition, edited by H. W. Marett Tims, M. A. (Cantab.), M. D., M. Ch. (Edin.), F. L. S., F. Z. S., and A. Hopewell-Smith, L. R. C. P., M. R. C. S., L. D. S. (Eng.). with 300 illustrations, 616 pages. Price, \$4.50 net. Published by P. Blakiston's Son & Co., Philadelphia.

Tomes' Dental Anatomy has long since become classic, and now that the present edition has had the benefit of revision to date by two such eminent men as the distinguished editors, the entire work may well be taken on faith. The work is divided into two parts: First, the Teeth of Man, and, second, Comparative Anatomy. The latter part is by far more elaborate than the former, and, aside from its scientific value, it will prove most interesting reading. The work altogether is one to be very highly commended.

NOTES ON DENTAL SURGERY AND PATHOLOGY. By T. W. Widdowson, L. D. S. (Eng.), with 159 illustrations. 345 pages. Price, 10s. 6d. net. Published by John Bale, Sons & Danielsson, Ltd., London.

This book is intended as a ready work of reference for the busy practitioner and a notebook for students. To the latter end it is interleaved with blank pages for notes. The author of this work wastes no time in superfluous verbiage—in fact, in some instances,

such as the description of various operations, it would seem as if he were almost too brief. And yet, in view of the wordy nature of some of our literature, brevity must be considered a distinct virtue. There are many valuable practical points running through the entire work, and it will prove a valuable addition to the dental library of any practitioner.

PRACTICAL ORTHODONTIA. By Martin Dewey, D. D. S., M. D., Professor of Dental Anatomy and Orthodontia, Kansas City Dental College; President of the Dewey School of Orthodontia. 248 illustrations. 342 pages. Published by C. V. Mosby Company, St. Louis, Mo.

In this book we have another very worthy addition to an already voluminous literature on the subject of orthodontia. In no department of our science has there been a more rapid development than in this, and each author adds something of value to the principles of the science. Dr. Dewey has made a distinct impression on the profession by his previous writings, and in the present volume he has crystallized his thought into a consecutive presentation of the subject. His chief aim seems to have been to emphasize the significance of occlusion as it affects irregularities of the teeth, and his many illustrations showing the effects of loss of the first permanent molars are a sermon in themselves. We bespeak a careful reading of this phase of the subject by those who have heretofore been in the habit of thoughtlessly extracting these teeth. We wish the author and publisher success in the distribution of this book.

AIDS TO DENTAL ANATOMY AND PHYSIOLOGY. By Arthur S. Underwood, M. R. C. S., L. D. S. Third edition. 136 pages. Price, \$1.00 net. Published by William Wood and Company, New York.

This is one of the "student's aid series," and the name of the author is sufficient guarantee that the work is well done. It is a compact and handy little volume very entertainingly written, and as comprehensive as the limits of the work would permit. As an appendix the author publishes a paper by J. Howard Mummery on "The Process of Calcification in Enamel and Dentin." This paper embodies practically the latest development in this subject, and should be read by every one interested.

CORRESPONDENCE.

ORAL FOCI OF INFECTION.

Chicago, December, 1914.

To the Editor:

Three very excellent articles appeared in the last issue of the Medical Journal, issued by the Chicago Medical Society, on this and allied subjects. While I feel that I am in thorough accord with much which the articles contained, I am in fear that the pendulum is again apt to swing too far in the opposite direction. It is true that far too little attention has been paid to oral foci of infection, but there seems at this time to be a new danger developing, and that is the wholesale extraction of teeth and extirpation of tonsils. Oral foci of infection are surely dangerous foci to be left uncared for, but there are many times opportunities and possibilities of saving the teeth infected, as well as the tonsils, secondarily invaded by micro-organisms. Whenever a newer method of treatment or procedure of avoiding disease is heralded the danger of permitting the pendulum to swing too far in the opposite direction is at hand and should be stopped. It is most timely that a warning should be sounded as to the danger of oral foci of infection, but the fact that many times the organs so infected can and should be preserved for future usefulness should not be overlooked.

The X-Ray, so highly commended for diagnostic work, must be read correctly and a mere shadow along the side of a root of a tooth is no reason why such members should be immediately sacrificed. Proper local attention, as well as the proper use of autogenous vaccines, will, in many cases, preserve these teeth for many years of usefulness, and ruinous extractions should at this time be warned against. In the use of vaccines much skill and judgment are required. It is of great importance to be certain that the cultures are obtained from the real sight of infection, and that the vaccines are absolutely perfectly prepared. The warning which Dr. Rosenow sends out in his article, to which I referred above, is timely and is of the greatest importance. The making of a smear and the autogenous vaccine obtained from any pus-laden surface is not at all sufficient. The virus must be obtained from such cultures where the infection is of the type causing the constitutional effects and must be sufficiently virulent to cause the effects we are to combat.

Judgment in advice and procedure is of greatest importance. The mere extraction of the teeth will not always be sufficient to overcome the trouble, for, if sufficient organisms have gained entrance to the system and are of sufficient virulency, the removal of the original source of infection will, of course, be of benefit, but may many times still require the introduction of autogenous vaccines to overcome the diminished output of the proper antibodies by the system. The tonsils are valuable germ filters and should be preserved whenever possible. The indiscriminate advice to remove them is not so simple a matter as it may appear, and the fact that these organs are of great value and should not be unnecessarily sacrificed should not be lost sight of. That oral foci of infection should be removed is quite certain, but that sound judgment is necessary in the forming of opinions as to the proper method to obtain these results and to be circumspect in ascribing secondary lesions to their proper cause and not to fall into the trap of believing all infections to be caused by oral foci is all important. Many times secondary infections are due to entirely different sources, and again proper thought and judgment must be our guide.

H. H. SCHUHMANN.

PRACTICAL HINTS.

Edited by J. E. Schaefer, D. D. S.

(This department is for busy readers. We want short articles containing practical hints—the shorter the better. No article must exceed 200 words, unless of exceptional merit. Every dentist has some useful hint that has been of value to him, and if he will only put it in print it may be of equal value to others. That is what this department is for. Due credit will be given for every article sent. Address J. E. Schaefer, 1745 W. Harrison St., Chicago, Ill.)

Broach Files:—Broach files are made by rubbing a smooth broach between two sharp, flat gold files.—*E. S. Best, D. D. S., Minneapolis.*

Radiographs:—In checking up an operation with a radiograph the distortion present in the radiograph is easily detected when the measurement wire in the canal is placed along side its shadow in the film.—*E. S. Best, D. D. S., Minneapolis.*

Practical Suggestion:—A good way to keep the little novocaine billets handy for use is to put them in capsules, such as are used to hold Canfield's gutta percha points. Much better than the long, thin bottle, as you can get one out at a time.—*Harry D. Lyon, D. D. S., Oakland, Cal.*

Filing Inlays:—In finishing the gingival margins of gold inlays I have found that the use of small gold files in connection with sandpaper strips enables me to get a satisfactory margin. The files will have a burnishing as well as a cutting action. Care should be taken not to cut into tooth just above the inlay margin.—*R. Davis, D. D. S., Minneapolis.*

To Facilitate Filling Root Canals:—To facilitate and maintain asepsis in the filling of root canals, procure some jiffy tubes, mix your root canal filling, and fill as many tubes as you wish for future use. Take a small pellet of cotton, place in large end of tube, then seal both ends of tube with light film of wax. When ready to use clip off small point of tube and proceed with filling.—*P. J. Noonan, D. D. S., Aurora, Ill.*

Misleading Advice:—The following is a very misleading piece of advice, especially to the young dentist: "Their dentist has either never known that it was necessary to turn the posterior margin of the plate up or has forgotten to do so, consequently there is no vacuum under the structure, and, of course, no retention, and the patient has become exasperated with it and discouraged." In seventy years' experience with artificial dentures I have never found such an expedient necessary to secure adhesion. If the impression is correct, a little scraping of the model in any case is all that is necessary. If the plate don't fit the turning of the edge of the plate is a poor expedient. Better take new impression and fit the plate perfectly.—*L. P. Haskell.*

The Use of Cocain in Pulp Extirpation and Treatment of Sensitive Dentin:—In the use of cocain for pulp extirpation I find better results are often obtained by sealing in cocain under gutta percha or temporary cement, rather than using pressure with unvulcanized rubber. In cases of extreme inflammation the result can

often be obtained with much less pain and discomfort to the patient if a pledget of cocain is carefully sealed in over exposure and filling allowed to set under slight pressure of a broad-ended instrument, and then left in place for about twenty minutes. My theory is that if a little time is given for drug to infiltrate through pulp tissue there is less chance of subsequent trouble in peri-apical region. Good results can be obtained in this way in treating sensitive cavities, but more pressure may be used in application.—*A. G. Salisbury, Takaka, New Zealand.*

Mercurial Stomatitis:—A mercurial toxemia occasionally met with in individuals who work with mercury, such as thermometer makers, mirror silverers, chemists, etc., and now and then from one of its salts administered for therapeutic purposes.

Certain individuals have a great susceptibility to mercury and its salts, and from administration of small amounts will experience the metallic taste, sore teeth, swollen, tender gums, salivation, fetid breath, diarrhea, etc., which make the diagnosis easy.

Little treatment is necessary except the withdrawal of the drug, or occupational changes, if that is the cause. Mouth cleanliness should be insisted upon, and five-grain tablets of potassium chlorate, allowed to dissolve in the mouth and swallowed, every hour. Occasionally potassium iodid in ten minim doses of the saturated solution t. i. d. will assist in eliminating the mercury from the tissues.—*P. G. Puterbaugh, D. D. S., Chicago, Ill.*

Removing Mercury from Amalgam:—The removal of the excess mercury during the packing instead of during the kneading is contrary to general practice and to the recommendations of amalgam authorities. But this procedure appears to have a most marked effect in greatly improving the character of the adaptation to cavity walls, and in all of my experimental work it is the only technic with which I have been able to secure results in adaptation. These results when made in round cavities, appear to be so positive to all who have participated in the work, as to eliminate all doubt in the necessity of this procedure. I have failed to find any disadvantage in my test fillings as a result of the change, as fillings so made are equally resistant to crushing stress and flow. In other words it does not seem to be important to the strength of the finished filling that we

remove the excess mercury during the kneading and the air test shows conclusively that this extra plasticity is absolutely essential to obtain uniformity of results.—*William E. Harper, D. D. S., Chicago, Ill.*

Faulty Diagnosis:—In March, 1911, a young man called at my office, having been referred by a physician. He complained that his upper anterior teeth were sore and loose, with pus discharging from the nose. He was twenty-five years of age, head bookkeeper of a large mercantile house. This man had the appearance of coming from a good family. He was intelligent, refined, courteous and handsome. He gave a history of having consulted a number of dentists, being informed each time that he was suffering from pyorrhea. He had had the roots scraped and the gums painted with iodine. Upon inquiry into the history of the case he admitted that he had had a chancre about three years ago and that he had taken treatment for syphilis for about three months.

Examination showed the septum perforated, the vomer and a part of the hard palate necrosed; the left central and lateral incisors very loose, with a considerable portion of the alveolar process destroyed. When I informed him that syphilis was the cause, he was much disturbed, but when I told him that he was going to lose a large part of the palate and septum and two teeth, he wept bitterly, and between sobs he begged pitifully for help. He offered everything he had if I would cure him without loss of so much tissue.

All this time I could not help thinking of the faulty diagnosis, viz., that the patient had pyorrhea! What a blot on the good name of dentistry!—*M. N. Federspiel, M. D., D. D. S., Milwaukee, Wis.*

OBITUARY.

DR. JAMES TRUMAN.

It is with sorrow that we note the death of Dr. James Truman of Philadelphia, Nov. 26, 1914. He was 88 years old. He had occupied many important positions in the profession, notably those of Dean of the Dental Department of the University of Pennsylvania, and editor of the International Dental Journal. He was one of the stalwarts of dentistry at a time when dentistry needed men of strong personality, and the value of his services

to the profession cannot be fully estimated. His influence was always in the direction of an uplift, and the basis of his character was a fundamental and unflinching honesty. We need men of his type in the profession and he lived long enough to leave a decided impress upon his times. The dental profession is richer because James Truman was a member of it.

WILLIAM ERNEST WALKER.

Wm. Ernest Walker, D. D. S., M. D. Born March 3rd, 1868 in New Orleans, La. Son of J. R. Walker, D. D. S., who practiced dentistry in New Orleans up to the time of his death in 1887, and Jeanie Mort, known to the profession as "Mrs. M. W. J.," over which *nom de plume* she contributed many articles to the various dental journals, particularly a department which she originated and called "Practical Points" in *Dental Digest*. She died in 1907.

Dr. Wm. Ernest Walker attended the public schools of New Orleans and studied dentistry in his father's office, later graduating with high honors from the Baltimore College of Dental Surgery in 1889. He opened his first office at Bay St. Louis, Miss., later moving to Pass Christian, Miss., where he enjoyed a large practice.

While practicing at Pass Christian he filled the chair of Clinical Dentistry at the Dental Department of the Southern Medical College in Atlanta, Ga., at the same time taking a medical course.

After two years spent in Atlanta he became connected with the Richmond College of Physicians and Surgeons, occupying the chair of Operative Dentistry while completing his medical studies. After obtaining his M. D. degree he resigned his professorship in order to devote all his time to practice.

Becoming more and more interested in Orthodontia he finally moved to New Orleans about twelve years ago, giving up the general practice of dentistry and limiting his practice to Orthodontia and Facial Orthopedia in which specialty he was remarkably successful. During his first few years of Orthodontia practice in New Orleans he was Dean of the New Orleans College of Dentistry where he also taught Orthodontia.

His death was quite unexpected; the result of Uremia, following an illness of one week. He is survived by two sisters, Mrs. S. A. Allis of Leesville, La., and Mrs. D. P. Allen of Beaumont, Tex., and one brother J. Mort Walker an officer of the Commercial Germania Trust & Savings Bank of New Orleans.

At the time of his death he was Secretary and Treasurer of the American Society of Orthodontists, member Delta Sigma Delta Fraternity and various local state and national dental and medical associations.

DR. C. R. BUTLER.

Just as we go to press we learn of the death of Dr. C. R. Butler of Cleveland, Ohio. We have not received particulars except that he died quite suddenly. Of all the men in the dental profession none was held in higher esteem than was Dr. Butler. In that select coterie of Cleveland practitioners dating back to the days of William H. Atkinson, when the gold foil filling was being particularly featured in professional activities, Dr. Butler was conspicuous as an operator of rare and cultivated skill. He was not only masterly in his manipulations but was possessed of a highly esthetic and artistic temperament. He had the courtly grace of the true gentleman and was an ornament to the profession of his choice and to society at large. In the circle in which he moved he was beloved as are few men, and his passing away will leave a vacant place which can never quite be filled.

MEMORANDA.

[Society notices will be given insertion in this department free of charge. Subsequent insertions will be charged for at the rate of \$2.00 an inch.]

NATIONAL ASSOCIATION OF DENTAL FACULTIES.

The next meeting will be held in Ann Arbor, Mich., January 25 and 26, 1915.

MASSACHUSETTS DENTAL SOCIETY.

The fifty-first annual meeting of the Massachusetts Dental Society will be held on May 5, 6, 7, 1915, at the Hotel Somerset, Boston, Mass. A. H. St. C. Chase, Secretary.

THE MINNEAPOLIS DISTRICT DENTAL SOCIETY.

This society will hold its annual meeting on February 11, 12 and 13, 1915, in the City Hall, Minneapolis. The first two days will be devoted to progressive clinics, papers and exhibits and the third day to an office-to-office clinic. Everything points to a most successful meeting, so reserve the time now. Dr. Harry W. Nelson, Secretary.

ARIZONA STATE DENTAL SOCIETY.

The Sixth Annual meeting of the Arizona State Dental Society was held at Phoenix, Arizona, Nov. 11th, 12th and 13th, and the following officers were elected for the present year: president, H. H. Wilson, Phoenix; vice president, L. A. Hawkins, Jerome; secretary-treasurer, J. L. O'Connell. J. L. O'Connell, secretary.

AMERICAN INSTITUTE OF DENTAL TEACHERS.

The annual meeting of the American Institute of Dental Teachers will be held at Ann Arbor, Michigan, January 26, 27, and 28, 1915. There will be a number of interesting papers, reports and discussions by prominent dental educators. All dental teachers are cordially invited to be present.—J. F. Biddle, Secretary. 517 Arch street, N. S. Pittsburgh, Pa.

CHATTANOOGA DENTAL SOCIETY.

The annual business meeting of the Chattanooga (Tennessee) Dental Society was held recently, during which the following officers were elected: President—Dr. William F. Stone; Vice-President—Dr. N. C. Hunt; Secretary—Dr. I. R. Stone; Treasurer—Dr. George W. Wagner. A paper read by Dr. R. S. Henry on vaccine therapy in oral infections provoked much interesting discussion. The society is planning to give semi-annual banquets to which dentists of national reputation will be invited to deliver scientific addresses.

CHICAGO DENTAL SOCIETY.

The annual mid-winter meeting of the Chicago Dental Society will be held in the Hotel La Salle, January 29th and 30th, 1915. Friday, January

29th, Dr. Robert B. Preble will read a paper entitled:—"Diagnosis of Systemic Disturbances Due to Oral Infection." Dr. Preble is a physician and one of the leading diagnosticians in America. The paper will be of practical interest to members of both the medical and dental professions. On the same date, Dr. Elmer E. Best will present a paper entitled:—"The Surgical Treatment of Pulp Canals as a Prevention of Systemic Disturbances." Dr. Best has made a special study of this phase of the subject and will give us something revolutionary in character. Saturday, January 30th, will be devoted to clinics. The clinicians will be so arranged that one can see to the best advantage the clinic in which he is especially interested. The meeting will close with a banquet Saturday evening, at which there will be speakers of national reputation and other attractions of equal interest to the audience. The exhibitors' display room will be open during the entire meeting. P. B. D. Idler, Secretary; T. L. Grisamore, President.



THE DENTAL REVIEW.

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CHICAGO, FEBRUARY, 1915.

No. 2

AN INTERESTING RECORD OF PORCELAIN OPERATIONS.*

BY WM. A. CAPON, D. D. S., PHILADELPHIA, PA.

It is a well-known fact in the dental profession that there has been a great diminution of the practice of porcelain as a filling, but at the same time there are many like myself who have given much of their time and study to this class of work and are satisfied that it is too valuable an addition to dentistry to cast it aside as not being worthy of attention. Many of you may be under the impression that it is a fad that has had its day and not worthy of further consideration. To those who have such thoughts I wish to say that they are laboring under a delusion and a few facts may emphasize this assertion.

The porcelain inlay is an accepted standard operation and a class of work that is not substituted by any other permanent material. It is also a fact that this branch of dentistry has a better status today than ever, for it has proven its position in many ways, and as an ardent advocate I am pleased to give you evidence that may be acceptable to the majority. Porcelain is now practiced by a class of men who have learned to recognize its difficulties and apply certain talents which are required to insure success. It is somewhat difficult for me to take this old subject and give it new phases or dress it so it will be acceptable to all, but I have been assured that a continuation of some of my experience would be interesting.

In past years I have read several papers on the subject of porcelain with the titles of: "After 12 Years," at Asbury Park, 1901, "After 15 years," at St. Paul, Minn., 1904, and "Porcelain

*Read before the American Dental Society of Europe.

After 18 Years," at Baltimore, in 1908. I am now continuing the subject, which covers an experience of 24 years.

I shall briefly show by lantern pictures the application of inlays to various parts of the teeth, continuing the records with additions from the last date of publication.

I desire to limit my time on this subject so that I may show the value of porcelain as applied to various special crowns, the record of which may be of interest to all present.

DIAGRAMS.



Fig. 1

Fig. 1. Miss W.; inspected March, 1906. Left central contour involving incisal edge, inserted September, 1892, remade April, 1904. For twelve years in excellent condition; loosened through break of tooth-enamel. Second operation lasted 10 years, when tooth was extracted. Report from a distant city.



Fig. 2

Fig. 2. Mrs. E.; age 60; inspected April, 1906. First upper bicuspid, filling inserted November, 1891. Edges first-class, no washing of cement, tooth turned dark and elongating. In ideal condition after 15 years. Report from Western city that inlay is still in place, nearly 23 years record.



Fig. 3



Fig. 4

Fig. 3. Rev. D. L. C. Right upper central incisor, inserted April, 1892. Pulp devitalized, inlay in good form, recementing joint at incisal edge, which could have been avoided by changing form of cavity. Right upper lateral jacket done at the same time;

now in excellent condition. Root treated through lingual surface 16 years ago. Still in good service.

Fig. 4. Mrs. E. D. W.; inspected June, 1906. Upper left incisor, very large contour, made in October, 1893. Patient in poor health for 20 years, the teeth requiring constant attention. This filling is in splendid condition except for washed joint on the lingual surface; on close inspection no decay found. Examined again in April, 1908. Tooth crowned in 1912. Inlay record, 19 years.



Fig. 5



Fig. 6

Fig. 5. Distal surface lower second bicuspid; operation in March, 1892; recemented after nine years in October, 1900. Interior of cavity in excellent condition; original inlay now in place and receiving no care whatever, and apparently as good as when first inserted. This patient is seen regularly.

Fig. 6. Mrs. H., young married woman. Had four proximal inlays inserted in October, 1895. Very poor structure and previously filled with cement to save them. Examined recently; very small line of washout, no decay, every indication of continued satisfaction. Record, 19 years.



Fig. 7

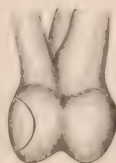


Fig. 8

Fig. 7. Mrs. S. T. K. Proximal cavities in central and lateral, also mesial surface of first molar (Fig. 8); fillings inserted December, 1895. Teeth soft and very susceptible to decay. These inlays examined regularly and are in good order, excepting a darkening of the cement line, which is a peculiarity of this case. Record of nearly 19 years.

Fig. 9. Mrs. M. C. Upper left lateral inserted January, 1893. Cement line washed on lingual surface, otherwise condition good; metal fillings in other teeth require constant attention owing to poor structure. Patient has lived for several years in tropical climate. This case was examined recently; filling in use for 21 years.



Fig. 9



Fig. 10

Fig. 10. Mrs. McP. Right upper central, large contour, inserted December, 1889; no pins or wire anchorage. Knocked out through carelessness in 1897, remade and attached. In beautiful condition at the present time. This is a record case, as tooth is living; it shows also the wonderful tenacity of cement if the cavity preparation be correct. This patient is seen regularly.



Fig. 11



Fig. 12

Fig. 11. Miss T. Left upper cuspid distal surface, inserted June, 1891. Examined December, 1913; teeth nearly all crowned. This porcelain inlay is in good order and shows little change after 23 years.

Fig. 12. Mr. Charles W. Distal surface of lateral incisor, inserted October, 1895. Examined recently; edges perfect and filling almost perfect from every point of view; really a good record of nearly 19 years.



Fig. 13



Fig. 14

Fig. 13. Miss A. Second upper bicuspid, mesial surface, and second lower bicuspid (Fig. 14), inserted October, 1892.

Examined October, 1913; edges and general conditions very satisfactory after 21 years.



Fig. 15



Fig. 16

Fig. 15. Mrs. W., an elderly lady. Central incisors, lingual surface, inserted February, 1892. Covered with jacket crowns in 1911. Nineteen years' use. Also lower cuspid and first bicuspid (Fig. 16). Bicuspid crowned in 1914. Teeth frail and enamel easily broken. While there was no decay, the porcelain edges were somewhat broken and the cement line emphasized. Twenty-two years, with cuspid inlay still in position.



Fig. 17



Fig. 18

Fig. 17. Miss M. Right upper central incisor, large contour, made in 1894. Regular patient. Pulp died in 1903. Discoloration of tooth made porcelain noticeable. Porcelain in excellent condition and cement line unusually good. Twenty years.

Fig. 18. Miss M. S. (now Mrs. H., of Baltimore). Two central corners inserted in November, 1891. I learn from the husband, who is a dentist, that the right corner had been replaced. Left corner still in good condition after nearly 23 years.

Another case almost identical with this a Mrs. W., now of New York, inserted in 1892; 22 years, with one renewal.



Fig. 19

Fig. 19. Mr. C. Corner lower incisor made in October, 1895; no pin or wire attachment; tooth prominent and subject to great strain. Examined about a year ago; appears to be in as

good order as when first inserted; cement not washed. Nearly 19 years ago.

Fig. 20. Mrs. A. Left lateral incisal corner inserted July 3, 1896; inspected June, 1913. Shade good and edges show very small change after 17 years.



Fig. 20



Fig. 21

Fig. 21. Mr. E. L. Mesial proximal of right central inserted June, 1898. He has not been a patient for many years and I chanced to meet him on the street last April, and during conversation I noticed that his tooth had worn, leaving the prominent corner as shown in the picture. It is a very unusual condition and proves that these corners are durable to an acceptable degree. Sixteen years of use.



Fig. 22

Fig. 22. Mrs. W. Lingual cusp of first bicuspid. Placed in March, 1899. Patient living in a distant city and had not chance of seeing condition until April, 1914. Very good condition considering position and strain of mastication. Fifteen years record.

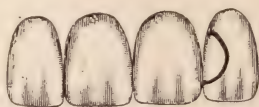


Fig. 21A.

Fig. 21A. Represents a mesial inlay in left lateral, inserted in September, 1892. Had not seen patient, who is a dentist, for 10 years, until he made a visit in September, 1912, for the purpose of recementing this inlay. The margins of both cavity and inlay were intact and the shade exceptionally good, so that after again inserting it, it had almost the appearance of one recently made. The right lateral was covered by a jacket crown made at the same time, and with exception of gum recession was in a very

acceptable condition after 20 years of unguarded use. This case is in good order now, giving 22 years' use.

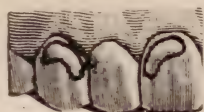


Fig. 22A.

Fig. 22A. Represents gingival border cavities in right cuspid and central, which were filled with porcelain inlays in January, 1891. The patient, a practicing dentist in Buffalo, N. Y., whom I had not seen for at least 15 years, visited Philadelphia recently, and I had an opportunity of seeing my oldest operation. They are far from perfect, but have saved the teeth for nearly 24 years, and he is proud of them and said he would not exchange them for the best gold fillings ever made.

The record of inlay operations just shown is not complete without referring to the wonderful stability of incisal restorations attached in most instances with wire loop or staple.



Fig. 23



Fig. 24

Figs. 23 and 24. There is no substitute for porcelain in such cases and I have no record of failures under normal conditions, and the appearance after many years is generally quite acceptable.

It will be noted that my list does not include many bicuspids and molars. This is due to the fact that porcelain inlays are not as durable in these teeth. After 10 or 12 years' use there is marked breaking of the margins, which is not possible with the gold inlay. Therefore, it is generally substituted unless appearance is a predominant factor.

CROWNS.

There are three forms of crowns that may be generally termed "The Jacket Crown," viz.:

The first and most important for general conditions in my estimation is that made with platinum frame which is retained as part of the crown.

The second is where the form is made of platinum foil and porcelain envelops the whole crown with the platinum and is generally known as the Spaulding, and the third is somewhat similar in technic, but leaving the lingual surface of the tooth intact, and is called "The Overlap." All of these crowns were originated by Dr. C. H. Land, of Detroit, whose ingenuity and perseverance on behalf of porcelain and required appliances has been of incalculable value to the profession.

All shell tube or hollow crowns have the advantage of being stronger than any pin or post crown, because there is less reduction of the original resisting surface to contact. The substitution of the original crown generally means the reduction of the fulcrum to a given point, which is at the cervical line, therefore a jacket crown must be stronger, for it does not create a weakness by restitution.



Fig. 25

Fig. 26

Fig. 27

Figs. 25, 26 and 27 fairly represent the amount of tooth structure sacrificed in each instance, and it is readily seen that the original with platinum base requires the least preparation and cutting of the crown.

Any of these forms can be used without devitalizing in the majority of cases but Fig. 25, has the advantage of being applicable to any foundation, whether the crown be intact or badly broken or deformed. It is wonderfully strong and therefore recommended for bicuspid or molars, and it is also very successfully applied to lower incisors, generally considered the most uncertain of positions for the application of any crown. This crown is used extensively by me for bridge extension and abutments; in fact, its general utility has few limitations, provided it is made properly. It is no "half way" proposition, but requires strict attention to details, which includes proper fusion of porcelain.

Figs. 28 and 29 represent my first and most extensive case of salivary action on the anterior teeth. It was published in

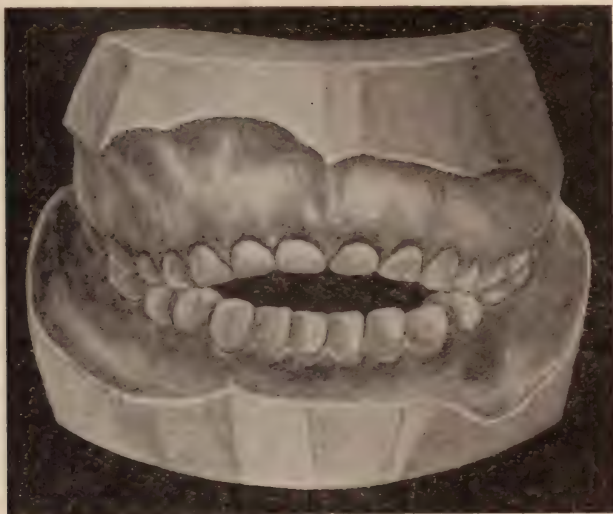


Fig. 28



Fig. 29

The Dental Cosmos, 1891, and copied by other magazines, so that

many are already acquainted with its peculiar condition and correction.

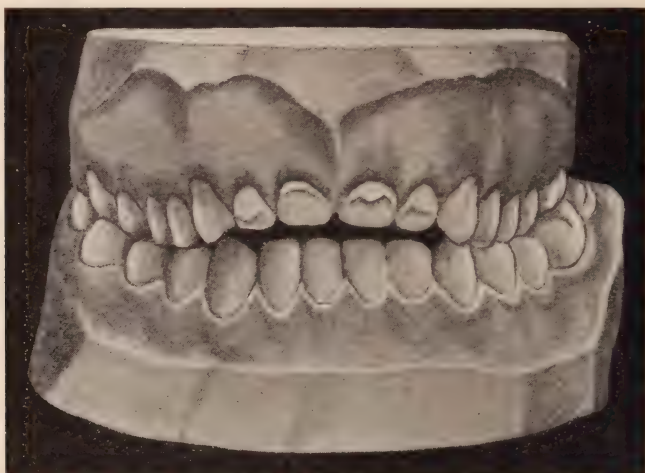


Fig. 30

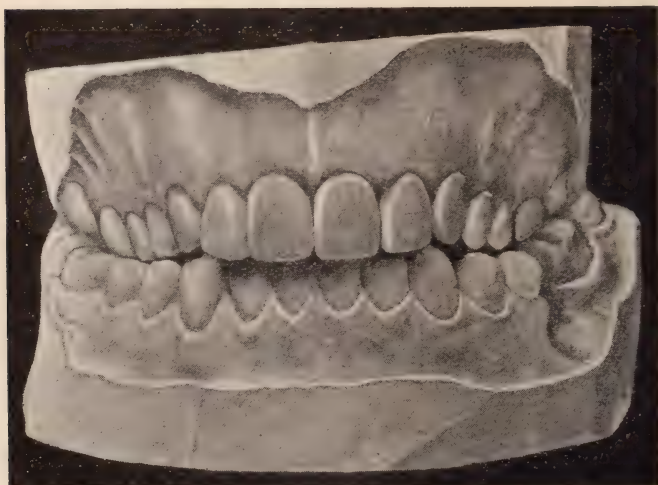


Fig. 31

Fig. 30 shows another case of erosion of four incisors. This is a mouth of a young man about 22 years old and was corrected by covering with jacket crowns 12 years ago. (Fig. 31.)

Fig. 32 is also one of my early cases, showing extensive abrasion, which was corrected by raising the bite and covering



Fig. 32



Fig. 33

the anterior teeth with jacket crowns. Patient 59 years old and used them with comfort for many years. (Fig. 33.)



Fig. 34

Fig. 34 is one of great deformity and presented more difficulties than many others because of irregularity of the teeth. The teeth were first brought to approximately the natural posi-

tion and then covered without devitalization, excepting the right central, which was too prominent to cut without exposure. (Fig. 35.)



Fig. 35



Fig. 36



Fig. 37

Fig. 36 is a case of a woman of 45 years and shows extensive wear of the anterior teeth. The bite was raised by bridges and the four anterior teeth covered by crowns. (Fig. 37.)

Fig. 38 represents a clinical case, youth of 19 years. Right central extracted when a boy. No left lateral, and a peg for the

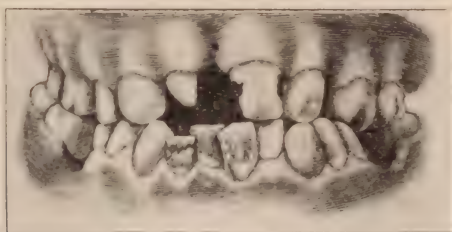


Fig. 38

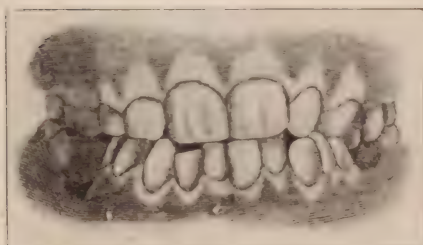


Fig. 39

right lateral. Corrected by two centrals with gum added at mesial border; contact to fill space made by extraction. (Fig. 39.) Date of operation, 1891.



Fig. 40

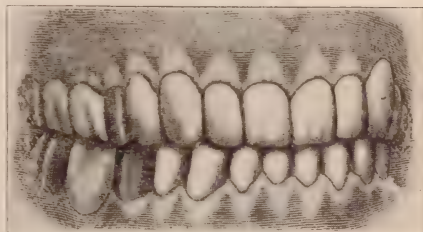


Fig. 41

Fig. 40 is a case of a woman of 40 years. Bite raised by bridges and the upper anterior teeth covered with crowns. (Fig. 41.) No devitalization, operation 1896.

Fig. 42 shows the unfortunate condition of a young lady of seventeen years. All her anterior teeth have defective enamel and are much pitted. There is also the additional defect that

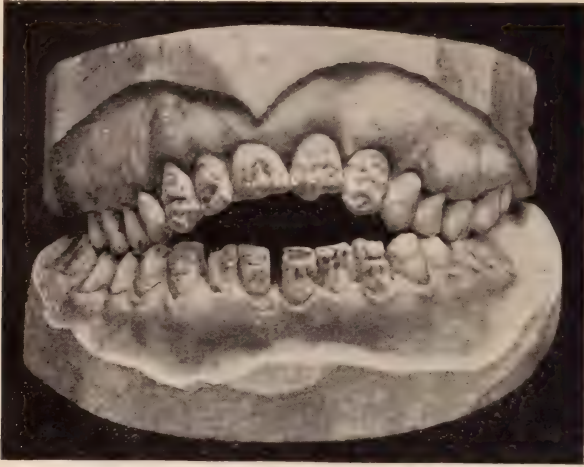


Fig. 42

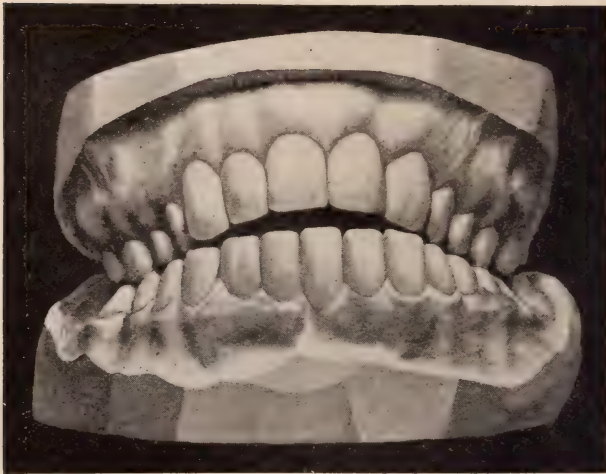


Fig. 43

there is no left lateral. When questioned as to what severe illness she had endured, she lispingly remarked that she had had "everything" and had "always been sick." It will be noted that while

the posterior teeth are in contact, the anterior are far apart. This deformity was, no doubt, caused by thumb-sucking, as the teeth were slow in eruption. In this case a complete correction was an impossibility, but the covering of both the upper and lower teeth from the cuspid reduced the space very considerably and the improvement in speech was very marked.

THE RESTORATION OF OCCLUSAL SURFACES OF MOLARS AND BICUSPIDS WITH CAST GOLD INLAYS.*

BY RODRIGUES OTTOLENGUI, M. D. S., D. D., S., LL. D., NEW YORK CITY.

Perhaps the one or chief thought which has actuated dentists in filling teeth has been the preservation of these most important organs from further destruction and loss through the continuance of caries. With the introduction by Taggart of the cast gold inlay, at first we only recognized that another, easier and better method of making large gold fillings had been placed at our disposal.

Today, however, in America the more advanced operators have come to realize that with this wonderful process it is possible to accomplish much more than the mere salvation of a carious tooth. With a properly constructed inlay we are now able to absolutely restore the original form of the tooth, to the minutest detail, the result being limited solely by the skill of the dentist. In this manner a tooth may not only be saved; it may likewise be restored to usefulness.

We have so long believed that the ultimate aim of dentistry is to save teeth, that it is with considerable difficulty that this idea can be dethroned. Yet with the knowledge we now have of the relation of proper mastication to bodily health, the advanced dentist must appreciate that the highest aim of dentistry in the future will not be to save teeth, but rather to save, or restore, health, by saving and restoring teeth.

It can be easily demonstrated that a tooth may be filled and saved, and yet not be restored to anything even resembling normal form. A tooth may be filled and saved with a filling so

*Read before the American Dental Society of Europe, July, 1914.

poor in form that the patient will actually avoid that side of the jaw when attempting mastication. A tooth may be filled and saved, in many instances for a long term of years, not only without restoring the particular tooth to such shape that it may resume its function as a masticatory unit, but on the contrary, in such manner that it may become a menace to its approximating and antagonizing neighbors.

This plea, then, is made to attract your attention to a broadening of this particular field of dentistry. The true dentist of the future may retain the title "dentist," but in reality he must be a "mouth physician." He must recognize the important bearing which mastication has upon bodily health, and he must study and learn the importance of maintaining every unit of the masticatory machinery up to such perfection of form that it will constantly deliver the highest efficiency.

This highest efficiency, however, can never be attained except by those that fully comprehend what may be termed the mechanics of mastication, which in a very important sense includes a comprehension not alone of cusp formation, but of the intent and purposes of such forms. We speak tritely of the normal, of the typical. But it is somewhat difficult sometimes to say what is or what is not typical. You may argue with me that teeth having short cusps, and shallow fossae and sulci, may be quite as typical as are the teeth with very long cusps, and therefore, having deep fossae, and sharply defined sulci, grooves and ridges. In reply I will say to you, that however that may be, that type of tooth which has the long cusp and the deep fossae and sulci will better serve our purpose in studying tooth forms and the mechanics of mastication.

I would recommend, therefore, that all who undertake this work should obtain, if possible, either a skull or else casts from life, showing teeth of this extreme type. Thus, and thus only, can the student learn the true meaning of the inclined planes, of the modeling of the surfaces of the cusps, of the grooves passing from the sulci and radiating upon the surfaces of the cusps and over the marginal ridge into the buccal and lingual surfaces, of the service rendered by the sulci, and especially of the most important purpose served by the mesial and distal marginal ridges.

In almost every discussion on this subject, some objector arises and declares that not all teeth are thus sharply modeled, or that if they once were, age has dimmed the lines and lowered the cusps. What of it? I am not asking you to have in mind one single molar tooth, and to copy its occlusal form for every occlusal inlay. In this field, as in every other field of human endeavor, one must proceed not alone with skill, but this skill must be admixed with judgment. Yet I have one special thought that I would leave with you on this particular point. Even though the tooth to be filled never was the typical tooth that you have studied; even though through use and abrasion its cusps have been lowered, nevertheless, we may improve its usefulness by a little exaggeration. Of course we cannot elevate the cusps above the lowered occlusal plane, but for functional purposes we can supply longer cusps by deepening the fossae and the sulci. Indeed, I especially recommend this procedure in one particular, which I will now describe.

We have been taught, and well taught, that it is essential to restore proximal contact, and by so doing to protect the soft tissues that normally occupy the interproximal spaces. In the filling of teeth with cohesive foil it has been not infrequently observed that despite the most skillful restoration of proximal contact, patients have returned complaining that food packed between the teeth. We have made examination and have demonstrated to the patient that a silk thread would pass with difficulty, and we have declared that the slight inflammation of the gum would pass away. But often it has not passed away, and many of us have been mystified. I think that this is no longer a mystery. If we closely study the mesial and distal marginal ridges in typically long cusped teeth, we will observe that these ridges serve as very important factors in the preservation of the interproximal soft tissues, by leading the food during mastication away from rather than into the interproximal space. If we fully comprehend this particular feature of the mechanics of mastication we can make precious use of it when forming our large inlay restorations. Here something more than the mere reproduction of natural form is needed.

We must remember that this particular tooth, in this par-

ticular mouth, was at one time of natural form, with natural proximal contact, yet for some reason, and despite these conditions, it has been attacked and partly destroyed by caries. Will it suffice to blindly copy what had been the original form of this partly destroyed tooth, or can we do more? I think that if we fully comprehend the physics and the physiological factors involved in mastication we can do better than to merely reproduce the original form. Perhaps the habits of the patient invited caries; or perhaps the original design of the tooth was sufficiently aberrant from the best type, so that its occlusal form was not sufficient protection. Be these factors what they may, the tooth once sound is now unsound, and consequently will need better protection from the invading enemy than ever. I believe that this may be accomplished in two ways. In nearly all such cases the interproximal tissues have been injured to some extent, and therefore would not fill the space, if the normal contact only should be reproduced. I deem it wise, therefore, to increase this area of contact, and this applies especially between molars. I therefore make such contacts wider than normal bucco-lingually, and deeper, occluso-gingivally. But this is not the principal point, and I am aware that it is one with which many will disagree. But whether the contactual area be restored to normal, or increased beyond normal, there is another precaution which I cannot too emphatically recommend to you. Make the mesial and distal marginal ridges as high as possible. Of course they cannot in actuality be higher than will be permitted by the antagonizing teeth, but in practical effect a ridge may be made much more pronounced than it was prior to the attack of caries, by deepening the little V-shaped fossa that lies adjacent to the ridge. The ridge should be formed with a plane sharply inclining towards the center of the occlusal surface, which, of course, means away from the interproximal space. This inclined plane of the marginal ridge should meet the central sulcus, and at that meeting point the sulcus should, in effect, divide, to form a V-shaped groove or trough, one arm of which will pass to the lingual and one to the buccal, thus leading the masticated food, first away from the interproximal space and towards the center of the tooth, and thence away from the interproximal tissues by discharging it buccally and lingually thereof.

Since my study of this particular feature of masticatory mechanics, I have come to believe that it is to our failure in providing these and other sluiceways that many interproximal infections have been due. Moreover, I likewise know that many conditions of interproximal inflammation and disease have been cured, and quickly cured, by removal of fillings, even though they were saving the teeth, and by replacing them with inlays constructed along the lines here indicated.

One more suggestion: The orthodontist makes study models and indicates to the patient, or to the patient's guardian, wherein the masticating apparatus is faulty, and the guardian readily consents to pay a high fee for the restoration of occlusal function by moving the natural teeth into proper place. The prosthodontist proceeds similarly and obtains a high fee for restoring masticatory function, with metal and porcelain. Why should not the dentist proceed similarly? In mouths where mastication has been hindered rather than helped, I consider it now a perfectly legitimate procedure to make study models which can be exhibited to the patient in comparison with models of normal occlusion, and then undertaking to completely rebuild the masticating apparatus by removal of fillings faulty in form, however perfect they may be in marginal fit, replacing the same with inlays which will restore to the patient the functional use of his teeth.

In conclusion, I wish to say that while this has been undertaken in my practice mainly as a prophylactic measure, in two conspicuous cases it has had a curative effect. In both instances the patients had been suffering with chronic constipation, which in each instance has cleared up. One of these cases was complicated by the presence of three blind abscesses, and without being specifically ill so that confinement to bed would be necessary, yet the patient suffered sufficiently with continual malaise so that she tried famous spas in America and Europe without avail, and had finally concluded that a nightly hepatic pill must be her only recourse. She has recently reported to me that during the six months last past she has never needed a pill nor medicine of any sort, and that, to phrase it as she herself did, she "feels young again."

DEFICIENCIES IN OUR AMALGAM TECHNIC, WITH
SUGGESTIONS FOR ITS IMPROVEMENT.*

BY WM. E. HARPER, D. D. S., CHICAGO, ILL.

After using the micrometer twenty years for testing alloys, I have abandoned the instrument for this purpose, using instead the Air Pressure Apparatus.

The Air Test will expose a defective filling, *whatever its cause*, faulty amalgam technic, or a poor alloy. The micrometer will show only such defects as result from shrinkage or expansion of the finished filling; and we commonly find a considerable range of movement without disturbance of the adaptation, this movement ranging from one point shrinkage to six or seven points expansion.

In the past four years I have made over 1,200 test fillings in my effort to learn the secret of perfect amalgam fillings. In this work I have used all of the well known alloys with every method of amalgam instrumentation and procedure with which I am familiar, using the Air Pressure Apparatus as a measure of the quality of the adaptation; and, in the light of such experience I do not hesitate to say that faulty amalgam procedure and technic are the most common causes of our amalgam failures. It is the purpose of my paper and clinic to demonstrate this fact, and, at the same time, show how we may greatly improve the quality of our work.

The general directions for using high grade alloys may be briefly stated as follows:

Proportions: to be found in the printed directions which accompany the alloy.

Mixing: Place in a deep glass mortar and rub the pestle around and across the bottom as rapidly as possible for two minutes, *by the watch*, knead in the hand half to one minute (the excess mercury to be removed during the packing instead of during the kneading); at this time the amalgam mass should be extremely plastic (but not sloppy), a condition essential to the most perfect and uniform results in adaptation.

Packing: Pack each piece of amalgam with a large flat serrated faced plugger, taking short steps, working from the center to and around the walls, using all the force of the pen grasp. As the

*Read before the Northern Illinois Dental Society.

excess mercury is expressed to the surface during the packing, scrape it off with the side of the plugger. Repeat the operation with each piece of amalgam added. In irregular cavities, a small angular plugger must be used to reach well into the angles.

The surplus amalgam expressed during the packing may be used again by pinching out the excess mercury.

The cavity should be filled to excess, and the thumb may be placed over the entire filling, compressing the amalgam against all margins, at the same time removing the surplus mercury. The filling should now remain undisturbed for about three minutes, after which time it can be trimmed to form and lightly burnished to the margins, and polished at a subsequent sitting.

A matrix must be used if one of the surrounding walls is missing.

The stability or permanency of form of our amalgam fillings (made with reliable alloys) is dependent upon the thoroughness of the mix.

A thorough mix cannot be judged by the apparent smooth plasticity, as such a condition is developed in all of our alloys long before the mix is complete.

Insufficient or an excess of mercury during the mixing may result finally in a smooth plastic mass, but careful tests on the micrometer and air tests will show evidence of an imperfect mix.

Time is absolutely essential, and I beg to emphasize its importance. If the mixing be done in the manner described, reasonably uniform results may be attained, and such procedure will allow the maximum time for the filling of the cavity.

The time suggested for the mixing may sometimes be advantageously increased, but should never be less than the minimum stated.

Adaptation cannot be secured with a reasonable degree of success unless the amalgam mass be in a *very* plastic state (free of crepitus or any indication of setting) during the insertion of most of the amalgam filling.

Plasticity and *compression* (using an alloy that hardens immediately upon the removal of the surplus mercury during the packing) are the vital factors essential to secure a non-leaking filling with a reasonable degree of uniformity.

The necessity for this *extra plasticity* becomes apparent when

the air pressure apparatus is used as a test for adaptation, and is a quality the profession and alloy manufacturers have failed to recognize. Fillings defective in this respect cannot be recognized when tested by the micrometer, which is a measure of movement only. The passage of air bubbles through water from the margins of a defective filling is conclusive evidence of faulty adaptation, strikingly apparent to any observer.

The directions presented are recommended as the best procedure for *all* high grade alloys, with the exception that different alloys require different proportions of alloy and mercury. The proper proportions may be found in the printed directions supplied by the manufacturer.

If the operator will learn to use *only such excess mercury as is necessary to make a perfect mix*, such procedure will result in the ideal condition of plasticity of the amalgam essential to the most perfect and stable adaptation, avoiding the necessity of adding or removing mercury during the mixing, which is very inaccurate and uncertain, and will be found a common cause of those bulk changes which sometimes follow the use of our most reliable alloys.

Insufficient time or rapidity of movement of the pestle in the mixing will have the same result: namely, an imperfect mix, which will result in an unstable filling.

To insure accuracy: At convenient times the operator, or assistant, can weigh into capsules ten and fifteen grains of alloy, and into other capsules the necessary proportions of mercury. These capsules are ready for immediate use, without inconvenience or loss of time, and the use of alloy in definite quantities will result in a great saving of material, because the operator soon learns the amount required for any particular cavity.

All dental alloys require a slight excess of mercury to make a perfect mix, but such excess should not be so great as to make a mass that fails to retain its form when made into a roll after mixing for two and a half or three minutes; nor should the mass show any signs of crepitus or setting during the kneading or while packing the first half of the filling, as fillings made under such conditions will show faulty adaptation to cavity walls.

The character of the plasticity of the amalgam mass most favorable to adaptation is that consistency between slight evidence of sloppiness and complete absence of crepitus or any indication

of setting; and the more completely the cavity is filled while the mass is in this condition, the better the result.

The alloy should be of such formula that when the surplus mercury is removed, as expressed to the surface during the packing, the condensed mass immediately hardens and stays where packed.

Proper mixing is best done by the use of a deep glass mortar, the inner surface of which has been slightly dulled (not ground) and a pestle of such design as to afford a firm grasp being taken of its handle. The head of the pestle should also be slightly dulled.

The time required, and the rapidity of movement of the pestle necessary for thorough amalgamation, make the use of a shallow mortar impracticable, because of the danger of loss of some of the contents during the operation.

A rough inner surface of the mortar tends to grind the alloy, which is objectionable; to say nothing of the extreme difficulty in completely removing the plastic mass, and keeping the mortar clean.

A complete mix is absolutely essential to a stable filling, and this cannot be accomplished in the mortar and hand in less time than two and a half to three minutes, a point upon which I would lay great stress, as at least ninety per cent of the operators it has been my privilege to observe take only half the time necessary to insure a complete mix. I use a sand glass, which hangs at a convenient place on the cabinet, to indicate the time. This appliance for timing has proved indispensable to me, and will be found a simple and convenient means of insuring the necessary time for a complete mix, and may be purchased from opticians or from department stores at a cost of ten cents upward, sold for timing eggs.

The mixing in the mortar must be done rather slowly at first to avoid losing some of the contents, rubbing in such manner as to keep engaged all of the alloy, the rubbing should be done quite rapidly after the mercury has engaged all of the filings, but not with weight and force, as it is not the purpose to grind the mass. Moderate rubbing together for the time mentioned is all that is necessary to make a complete mix, the consistency of which should be as previously described. The only practical way of securing this necessary extreme plasticity in the high grade alloys that are sufficiently strong in their resistance to crushing stress and flow, is *not* to remove the excess mercury during the final kneading. The extra plasticity of the mass, a result of this procedure, will permit of

perfect adaptation, as the very plastic mass will flow under the condensing force, retaining its continuity in all directions as it spreads or is forced against the surrounding walls. If the excess mercury be removed during the kneading, the mass as condensed will be found to contain microscopic cracks radiating from the center of the mass condensed; these imperfections, often invisible to the naked eye, are commonly bridged over in the subsequent packing. Sufficient condensing force, after the initial packing, cannot be made with a large plugger to obliterate them, as all high grade alloys harden immediately with the removal of the excess mercury under forcible packing; after which the condensed filling will not flow further or yield sufficiently to eliminate these imperfections; and the use of a small plugger with sufficient thoroughness would require so much time as to disturb the filling during the setting process, which is equally objectionable.

FIXED BRIDGE WORK.*

BY L. W. STRONG, D. D. S., CHICAGO, ILL.

It is the purpose of this paper to discuss fixed bridge work and to endeavor to cover such ground as lies within the limits and abilities of the general practitioner.

The fixed bridge under discussion shall be understood to be made of gold, iridio-platinum and porcelain, in their various combinations. We shall not consider the all-porcelain, nor the fixed removable bridge, largely for the reason that a discussion of either of these bridges could occupy the entire time allotted this paper.

It is not my purpose to advocate fixed bridge work to the exclusion of other forms of bridge work where such other forms would be more serviceable or hygienic, nor do I expect to cover the subject of fixed bridge work completely in these few minutes, or settle the many questions which are somewhat in dispute at this time. However, I wish to again draw your attention to some aspects of this subject, and to place before you, in condensed form, some facts that have been stated many times in the past, and probably will be in the future, and to present, in logical sequence, some of the steps

*Read before the Chicago Dental Society, November, 1914.

in the building of a fixed bridge, which, so far as many are able to observe, have not had sufficient importance attached to them by altogether too many, who are at present engaged in the practice of this branch of dental prosthesis.

In order to bring the subject clearly before your mind's eye this evening, it is judged permissible to refer briefly to some of the historical events which have made possible the present-day crown and bridge work in all its different phases.

As far back as 1728 dental literature contains accounts of some primitive applications of crowns to roots, thereby attempting the same principle of restoration that is practiced today, but the first really important and decisive steps toward our present-day methods were made in the year 1869. It was in this year that the ideas embracing the several component parts of our present fixed bridge were given to the profession.

At this time W. M. Morrison designed and described the gold shell or telescope crown, which was afterward patented by Beers. G. V. Black contributed the idea of a combined gold and porcelain crown. The various other steps were divided between Bean, Bennett and Bing. Some time later C. M. Richmond gave to the dental profession the idea of the "Richmond Crown," which was the first practical application of a band to a root for anterior crowns, with the porcelain facing, and while the original crown has undergone many modifications and improvements, it is at present one of the most useful and serviceable crowns that we have. Thus it will be noted that *these* men deserve much of the credit for the success of our modern crown and bridge work. In looking over a text book published 25 years ago, I was surprised to learn that most of the questions in controversy at the present time were then likewise under discussion. These questions were presented in much the same manner that they are today, and from about the same view points. As a result of the review of the literature I am constrained to believe that there is not much new and sensational in crown and bridge work which can be brought out this evening, but that, by virtue of the activity of the many bright minds in the dental profession—the activity of men who have given their time and thought to this subject, who have contributed the articles to our dental literature and have given us the marvelously complete text-books which we have the privilege of consulting at all times—this branch of dental

prosthesis has been brought to a highly creditable state, if not a really scientific art. However, it is to be deplored that with this wealth of data at our command, and the almost inexhaustible mass of collected facts at our disposal, so many have failed to inform themselves in regard to the underlying principles of crown and bridge work and the necessary requirements indicating its application.

I am frank to acknowledge that the "fixed bridge" is one of the many temptations lying in the pathway of the unsuspecting practitioner of dentistry. It presents, at first sight, so many promising possibilities, is so beautifully perfect to gaze upon when first inserted, and so nearly like the product of nature for which it is substituted, that we could quite forgive its present almost universal employment, if it were not for the multitude of recorded facts which teach us that "things are not (always) what they seem," and that there are many other phases to be considered, together with the ones just mentioned. Much has been said and written for and against fixed bridge work, but it is believed by the writer that "the intrinsic merit of properly constructed bridge work is undoubted, and most of the objections are based on improperly designed and constructed pieces."

I believe that it will be generally conceded, that just so long as teeth are lost, and are replaced by prosthetic replacements, just so long will fixed bridge work be used, and if this be in any sense true, it surely becomes our imperative duty to possess ourselves of such knowledge and perfect ourselves in such constructive technique as will enable each one of us to produce a bridge, which will at least be the visible example of the combination of our brains and digital skill. In other words, let us put into practice the things that we know, or should know, and thereby remove the "fixed bridge" from the list of the undesirable and the "unclean."

One of our most eminent authorities makes the statement that up to seven years ago "Dental bridge work was a bewildering and chaotic mass of details and consequently primitive and empirical."

The successful application of bridge work involves so many different aspects of dentistry that it is impractical to lay down many positive rules which can be applied to all cases, therefore the chances for success in this operation will increase in proportion to the practitioner's knowledge of the subject and his sound judgment

exercised in applying the same. Scientific understanding of crown and bridge work, good judgment, mechanical skill, and artistic ability, are a few of the requirements for the successful bridge builder.

The ordinary practitioner of dentistry very often allows himself to drift into a line of practice which may best suit his desires and abilities, but which develops but one viewpoint, and causes him to see his chosen line of work indicated in every case coming to his notice. I am sure that most every one can recall such an example. The development of such a faulty viewpoint is unfortunate both for the dentist and the patient.

The general practitioner who keeps himself *free* from the influences of fads and extremes is better able to judge his cases from every side and thus give his patient advice, unbiased by any special knowledge or skill that he may possess. It is by virtue of a general knowledge and a broad viewpoint that we may hope to be able to study our cases intelligently and apply the correct form of prosthetic restoration at all times.

In the mouth all operations are closely associated and somewhat correlated, consequently fillings, pulp treatments, root canal treatments, etc., become an important part of prosthetic dentistry.

We assume that, excepting in rare instances, all teeth which are to be used as abutments or piers have had their pulps removed and root canals properly filled. In advocating this step in all cases our authority is based upon the generally accepted fact that "the pulp is purely a formative organ, and that its physiological function terminates with the complete development of the tooth." As to the preserving of the pulp in crown and bridge operations, I only wish to quote the words of an English dentist who says: "I have put crowns on living teeth, and I have inferred from what my patients said that they would rather go seventeen years without a crown than to have another one done." While the exact indications for fixed bridges are indefinite, and depend largely upon conditions presented in each case and the ability of the operator to recognize indications, still there are a few primary requirements which must be present before success with a fixed bridge can be hoped for. In considering a case for the application of a "fixed bridge," the very first step should always be the making of study models, and at some leisure time the known indications for a fixed

bridge can be verified, bearing in mind the fact that the interests of the patient should be paramount to all other considerations.

Teeth or roots to be used as abutments and piers must be healthy and strong. They should be in normal position in the arch, in order that they may not be subjected to undue stress or strain due to abnormal or faulty occlusion. There must be sufficient room for the employment of ample material to insure the strength, durability, and efficiency of the piece under stress and strain. This same necessary space is also for the extremely important purpose of allowing the patient to properly cleanse the bridge. Mouths which receive care and attention are favorable for fixed bridges. Under no circumstance can we expect a fixed bridge to be successful if placed amid unclean surroundings, for no matter how carefully the preliminary steps have been carried out and the mechanical construction perfected, if the patient fails to take the proper care of his or her mouth, your efforts will end in failure. Therefore, do not place a fixed bridge in a mouth, no matter how favorable all other conditions may be, unless you are satisfied that the mouth is receiving sufficient care and attention to protect *your* work and the patient's health. Fixed bridges must satisfy the hygienic, cosmetic and esthetic requirements of each case. The other aspects of this subject to be touched upon will be from the standpoint of

STRENGTH, COSMETIC AND ESTHETIC REQUIREMENTS AND HYGIENIC CONSIDERATIONS.

Strength and durability depend first upon the healthy condition and proper preparation of the abutment, and next upon the mechanical construction of the crowns and dummies.

While no attempt will be made to enter into the details of the proper preparation of tooth or root to be used as an abutment, nor the construction of crowns for abutments, yet the abutment is such an important part of a bridge that every detail of the construction of individual crowns *must be observed*. One of the greatest factors entering into the failures of fixed bridges is improper treatment of roots and improper preparation of the abutment for the reception of the crown. Abutment crowns should always be reinforced to provide against any chance of their stretch-

ing out of shape or fracturing, for it is not alone sufficient that a band fit a root perfectly; it must continue to do so. If inlays are used as abutments, they should cover large areas of the surface of the tooth to be used. The width of the inlay (bucco-lingually) used as an abutment, should always be made to equal or exceed, at some point on the occlusal surface, the bucco-lingual width of the dummy cusps. The gingival margins should be placed well below the soft tissues, and the other cavity margins should be placed in self-cleansing areas. Inlay abutments should always have supplemental pin anchorage or its equivalent.

"A dental bridge is essentially a continuous masticating surface anchored to supporting abutments at two or more points of its length." Turner says that "by uniting or splinting together several teeth as in a bridge piece, the movement of each tooth is modified or restrained, and by such fixation two natural teeth are frequently found to successfully withstand more force than the sum of their individual resistance." There is a rule laid down along this line which says that there should never be more dummies in the bridge than there are abutments and piers, and this seems to be a very safe and conservative statement to remember. The larger proportion of your successes will be among your small bridges, and the chances for failure increase in proportion to the increase in size.

Most extensive pieces of fixed bridge work would be more satisfactory to all concerned, if they were handled in some other manner. Substitutes or "dummies" should be, *as far as possible*, of porcelain, and of the interchangeable or replaceable kind.

There are several different makes of such teeth from which to choose, and the final selection will differ according to the opinion of the various operators. Within recent years it has become almost standard practice to use only cemented or replaceable porcelain teeth and facings.

At the recent fiftieth anniversary celebration of the Illinois State Dental Society in the "Fixed Bridge Clinic" it was noted that the fixed bridges, exhibited as the work of about twenty of the best crown and bridge men in the great state of Illinois, demonstrated the unanimous adoption of the idea of the interchangeable or replaceable tooth or facing, in the construction of fixed bridges. The advantages of this style of tooth are many and undeniable, and have been so prominently placed before you of late that they will

not be enumerated here. It seems unnecessary to say that this is one of the most valuable aids that has come to the assistance of the ordinary practitioner of late years—to say nothing of the patient. There is one exception that might be made, and that is in favor of the all-gold lower bridge for positions posterior to the first bicuspid. This so-called “sanitary bridge” is much used and has its advantages in some few cases. A suggestion that might be offered to improve it and help to make it deserve its name of sanitary bridge is that the under surface of the cusps used for restoring the masticating surface be brought to a point in the form of an equilateral triangle, thus dispensing with the flat surface toward the ridge, and running from one abutment to the other, which surface is always more or less unclean, as it cannot be reached with the tooth brush. If this under surface of the cusps is brought down to almost touch the soft tissues and in the form of a triangle, with the base toward the occlusal and the arms forming the vertex toward the ridge (a cross section would appear as an equilateral triangle), it will reduce the usual unclean surface sixty per cent and make it possible to clean this surface quite easily and thoroughly with the tooth brush. Before considering the fixed bridge from a hygienic standpoint, a few words regarding esthetic requirements may be in order. It should be the object of the conscientious operator to prepare a bridge that will be not only strong and serviceable, and will act as a suitable and unconscious substitute for lost natural organs, but a bridge which will also simulate such organs in appearance as in utility; if your bridge fails in any one of the fundamental requirements of a fixed bridge, it will be classed as a failure. Careful attention must be given to the size, color, and arrangement of the substitutes that they may be natural in appearance and in harmony with the other features of the face; for no matter how skillfully you may build mechanically or how wisely and perfectly your work is planned and executed, if it does not bear the relation demanded by age, temperament, facial contour, etc., it will be conspicuous and therefore objectionable.

If it were the intention of this paper to defend fixed bridge work (and it seems to have been put upon the defensive of late), everything which has been said up to this time would be preliminary to the real evidence in the case. However, this is not the fact, as was fully stated in the beginning; but rather is it the desire

and purpose of the writer to emphasize some points relative to the subject which are not given sufficient recognition by the profession *as a whole*. The fixed bridge has been used and tolerated all these years in its many incomplete and inadequate forms, and has been able to overcome in some way, or arrogantly ignore, every objection raised, without placing in jeopardy its position at the head of the line of dental restorations, until the recent assault was made from the hygienic standpoint, and given such merited prominence and publicity. This has proven the most effective avenue of assault thus far, and has ominously threatened its standing and popularity.

At this point I wish to read some observations by three well-known men who are interested in teeth from the hygienic standpoint. Horace Fletcher asks this pointed question: "Are teeth essential to the civilized man?" D. D. Smith of prophylactic fame, before the Illinois State Dental Society at Peoria in 1913, made this statement: "It may seem incongruous or out of harmony with the present theories of dentistry to say that teeth as commonly found in the human mouth are a menace to both health and longevity, or to put the same truth in another way, to say that the loss of all teeth from the uncared for mouth in adult life would be a safeguard against many systemic diseases and markedly lengthen the average of human life."

W. C. Hulick, Cincinnati, Ohio, says: "As to hygienic conditions by comparison, as between fixed and removable bridges or partial plate, if you please, if the abutting teeth have been well prepared, all things being equal, there seems to be no difference in my mind." That the ordinary fixed bridge, carelessly planned and constructed, is open to criticism from the hygienic standpoint, is conceded. It is the writer's opinion, however, that selected cases, properly constructed, can be made to conform to hygienic demand, provided they are given the necessary attention by the patient. Every person wearing a fixed bridge is entitled to know the importance of maintaining its hygienic integrity, for the purpose of prolonging its length of service and, incidentally, their own good health. There are three other points in bridge construction which must be observed if we hope to attain anything approaching hygienic requirements, which are, the width of the cusps bucco-lingually, the width of embrasures, and the form of the solder connection between

abutments and dummies. I am aware of the objection by many to a narrowing of dummy cusps bucco-lingually, but I maintain that they should never be made wide enough to form a "shelf" which cannot be brushed clean with the tooth brush. The embrasures and interproximal spaces in fixed bridges should be sufficiently broad that they also may be cleaned in the act of brushing the teeth. The point of union between abutments and dummies should be but little larger than a normal contact point. Aside from the abutments, this junction point as it is commonly made is responsible for much of the criticism directed toward the fixed bridge by profession and laity. It is one of the most abused and neglected places in the entire bridge, and the most fruitful source of unsanitary and unhygienic manifestations. Careless construction at this point not only endangers the permanency of the abutment, but in some instances it threatens the health, happiness and frequently the very existence of the individual. Every means should be employed to make this part of the bridge meet the hygienic demands.

Wide embrasures and small contact points will eliminate these objections sufficiently to make the work practical. A small surface at this junction point can be obtained by the use of iridio-platinum wire for reinforcement, which gives ample strength without unnecessary bulk.

The millennium in fixed bridge work, or any other kind of bridge work, is still a long way off, and while we are waiting for the many improvements which will surely come, to place this branch of prosthetic dentistry upon an ideal basis, let us make use of the magnificent fund of collected facts already at our threshold.

It is the duty of every man to give the best that is in him in these matters, and if this paper can influence but a few to realize the importance of seriously considering the various steps, involved in the construction of a fixed bridge, it will have served a worthy purpose by helping to answer in the affirmative the question asked by Dr. Chas. H. Mayo before this society, when he said: "It is evident that the next great step in preventive medicine should be made by the dentists. The question is, will they do it?"

INDIVIDUAL CROWNS.*

BY R. E. MAC BOYLE, D. D. S., CHICAGO, ILL.

When invited to write a paper on Individual Crowns, I was told that a paper of practical value was wanted, that is, that it should contain advice which dentists could take away with them and use.

This I will attempt to do, not by burdening you with the technic of the construction of the different crowns, but rather to point out certain underlying and fundamental principles pertaining and necessary to successful crown-work, which as we know, are so often disregarded and overlooked and the fact of this disregard defeats or precludes the possibility of having our completed crown the success that it should be. This subject should be considered from a broad view point, on account of the different conditions which are met with in different localities and still, the same underlying principles apply. I will not deal to any great extent with the technic of construction because different and individual dentists work out a technic of their own, the results of each possibly being satisfactory; so I will deal especially with results as I think they should be, and the principles necessary to regard and carry out in order that the results may be satisfactory. It does not matter what our technic is provided that our results are good.

Now a crown to be really successful in its purpose and function of replacing and substituting a lost natural crown, must possess several characteristics which are necessary and fundamental, otherwise the crown is a failure. Enumerating these characteristics, first, an artificial crown must be fitted and adapted so accurately to the root that the root will be protected against decay and disintegration. The adaptation must be such that the crown will be non-irritating to the soft tissues. The crown must be such that it can be easily cleansed. It must possess sufficient mechanical strength to insure durability and it must be natural in form and natural and pleasing in appearance. In other words an artificial crown must possess all of the qualities of a natural

*Read before the Chicago Dental Society, November, 1914.

crown in so far as is possible. Now you all say that you already know this; that this advice is nothing new; that it has been told many times before. Yes, and yet what percentage of crowns do we see which possess these qualities necessary for a properly constructed and successful crown? I want to tell you as you also already know that the percentage of properly constructed crowns when compared to the whole is very small. I believe that the majority of crowns which are placed in the mouths of humanity would be better consigned to the scrap pile where they could do no harm.

Now if it is a fact that a crown to be what it should be, and useful instead of being a menace, should possess the qualities which I have enumerated, it seems to me that it is a matter which dentists generally should give more careful consideration and study than they do; which is evidenced by the abnormal conditions which we so often find.

We may say that we know what a crown should be and deliberately proceed to do not as well as we know. It is a very good idea when mounting a crown for a patient to ask ourselves, confidentially on the side, if that crown which we have just mounted is the same kind and quality of a crown that we would wish placed in our own mouth. The application of the golden rule is very appropriate in this matter of crowns, and it is a fact that all poorly constructed crowns are not made in dental parlors and advertising offices.

In considering the different types of crowns which I believe are indicated under general conditions I will first consider the Gold Shell Crown. This is a crown which we will probably always employ as long as crown work is done and their use should always be confined to the posterior teeth and especially to the molars. The inlay method enables us to inlay many posterior teeth which would otherwise require the shell crown and in some of the longer bite cases porcelain crowns for molars are desirable and still there are many cases where the shell crown properly constructed is necessary for the best results.

I believe that it is necessary to devitalize the pulp, as a rule, in order that we may properly prepare a root for the reception of a shell crown. I know that there are many dentists who argue against devitalizing but the X-ray is quite successfully offsetting

this argument by revealing very improperly fitted bands in cases where devitalizing has not been done. True many bands do not fit properly where devitalizing has been done, but in these cases it is due to the carelessness of the operator in not taking sufficient time and care to properly straighten the root.

Possibly some day we may discover a method of safely desensitizing so that we may be able to properly prepare a root for a shell crown without devitalizing, but with this method must also come an assurance against future trouble, such as sensitive gingivae, dying pulps, etc., with all of the attending difficulties. In shell crowns the proper preparation of root, adaptation of the band at the gingival, the proper natural contour and occlusion, and the proper contact with proximating teeth are the necessary requisites, and I believe that the only successful method of obtaining the proper occlusion is to carve the cusps whether for casting or swaging.

We should remember that a shell crown should possess a grinding occlusal surface and not a plier-made mashing occlusal surface.

I can see no advantage in the seamless shell crown, and in some cases of a hard occlusal stress there is a disadvantage in the way of a spreading of the crown at the gingival, due to the fact that the grain of the metal in a seamless crown runs parallel with the long axis of the tooth and the tendency of the gold is to assume its original flat shape. For this reason seamless crowns should be reinforced with a small amount of 22k solder at the gingival.

I am a firm believer in the use of the banded dowel crown in many cases. In fact, I believe that the banded Richmond, whether cast or soldered, and the gold shell crown represent the very foundation of crown work, because they are necessary in those short, hard bite cases of which we meet so many, and especially in certain localities.

The tendency often is to become enthused with some new idea, and in our enthusiasm for the new forget the old, tried, true and dependable methods, and this is true, I think, of other departments than crown work.

There are crowns which are more ideal than the Richmond, namely, the porcelain crowns; but if we undertake to use these

in all cases we simply overdo the matter and often come to grief. There are cases where I find that the good, old-fashioned soldered Richmond crown meets the conditions better than any other. I have heard several papers read and have read many articles on the subject of banded dowel crowns, and the argument in most cases is that the properly fitted banded crown is, no doubt, the best possible crown when considered from all standpoints, and especially for the short, hard bite cases and for anterior abutments for bridges, and then the burden of the argument is that dentists generally have not the ability to properly fit a band, consequently it is better to use some type of crown which is bandless. I believe that the banded dowel crown is positively indicated in many cases and especially for the upper anterior teeth where the bite is hard; here in many cases we must guard against the possibility of fractured roots, and the banded crown with the band first fitted and the floor soldered to it, making the coping, I believe, is more durable and more of a protection to the root than is the swaged coping.

For anterior bridge abutments I believe that the banded dowel crown should always be used where possible, and if it is a fact that dentists generally do not possess the ability to properly fit the banded crown, they should learn to do it, because it is a possibility.

The first necessary requisite in this work, as in all types of crown, is to properly prepare the root. The enamel must be removed and the band should simply take the place of the enamel and should at no point extend beneath the free gum margin to exceed $1/32$ of an inch, and at the labial mesial and distal $1/60$ of an inch is generally sufficient.

The great bugbear of the porcelain-faced crown, such as the Richmond, is the breaking away of the facings, and I believe that this is generally due to the fact that the facings are not properly ground. If we would expect a facing to remain in place we must protect it with a sufficient thickness of metal, consequently we must sacrifice the lingual aspect of the facing in order that we may have sufficient protecting gold.

In the cases of the medium and longer bite the detached post porcelain crown is indicated for at least the eight anterior teeth, both above and below, and of these crowns there are

several different makes, each possessing the required qualities, the Goslee crown requiring the least grinding and being the more nearly replaceable. However, there are cases where the longer lingual of porcelain may be preferred and for these some of the other makes are preferable.

These crowns, I believe, should always be made with an intervening metal base between crown and root, and may be made banded or bandless, according to the requirements of the case. If made bandless, a base of either platinum or pure gold of 36-gauge should first be swaged and burnished to perfect adaptation to the root and the dowel fitted and attached to the base with 20 or 22k solder, then the porcelain crown ground to fit at the labial, leaving space toward the lingual, which is filled with inlay wax and cast, it being often necessary and advisable to include in the casting the post portion which extends up into the porcelain.

The advantage of first fitting the thin metal coping to the face of the root is that you can burnish it up around the periphery of the root and just beneath the free gum margin, making a coping that will protect the root better than will a base which is all cast. To prepare this coping, I take an impression of the face of the root with inlay wax or base-plate gutta-percha, into which I press cement mixed to a putty consistency. This will harden in a few moments, when the cement model of the root is placed in the Lac of the Lac swager and the thin metal swaged. It is now taken to the mouth and trimmed and burnished to the root, the final burnishing being done after the post is soldered in. There are cases, however, where it is possibly better to cast the entire base, not using the thin metal, and these cases are where the root is broken down to a point where it would be impossible and not advisable to burnish the gold up around the periphery of the root.

These porcelain crowns with a metal base may also be made by fitting the thin metal to the root and also to the base of the crown and filling in between with solder, but generally on account of lack of space the method of casting is preferable. If, in constructing this crown, you make a coping with a band and floor to which you will cast the intervening metal, do not use less than 20k fineness of solder in the soldering of the band

floor and post, because lower than 20k will often fuse during the casting process.

Now, we should give some consideration to the detached post crown when employed without the metal base and it is possibly best named the ready-made crown. It is useless to say that these ready-made crowns should never be used, because there are conditions of locality and expense, etc., which make them necessary, but the abuse of this variety of crown should be decried.

This ready-made variety as it is abused is, no doubt, the cause of the loss of more roots from decay, fracture, etc., than any other one item or number of items pertaining to crown work, and the great number of these crowns which we see so poorly adapted is convincing evidence that many dentists are working along the lines of least resistance and doing this work in the easiest possible way for themselves and absolutely disregarding the welfare of the patient.

Now, if you must use this ready-made crown, let me plead with you to take more time and use more care in fitting and adapting it.

This variety of crown always suggests an easy method of crowning a root and I fear that entirely too many dentists are attracted by the fact that this crown possesses qualities which prevent a great deal of the tedious labor required in the construction of the metal base variety which I have previously mentioned.

Let me ask those who carelessly fit these crowns, how they would like to have one or more of them placed in their own mouths, where they are ground carelessly and in a hurry, and the intervening space between crown and root filled with cement when mounted. You will, of course, say that you would not want such a crown and possibly you would also say that the patient does not know the difference, which is no doubt true in many cases, but not in all; and let me say that the fact of the patient's ignorance and innocence makes the dentist doubly guilty. I feel very keenly about this matter, because I am in a position where I see so much of the abuse of this ready-made crown.

To properly adapt the ready-made crown, the preparation of the root is most important and I would prefer what might

be termed the V-shaped preparation; that is, the center of the root extending from mesial to distal should be left longer, representing the apex of the V, and from this point bevel the root up to just slightly beneath the gum margin at both labial and lingual. Now select the proper size of crown, and use care and sufficient time to grind it to fit the root, and time, care and ability are the necessary requisites to insure success. When the adaptation is completed the crown at the gingival should be the exact size of the root, no larger nor smaller in diameter.

In mounting this crown I believe that it is a good plan to use a thin disc of base-plate gutta-percha between the crown and root, in order that the slight deficiencies of the junction between crown and root may be filled with gutta-percha rather than cement. The gutta-percha disc must be warmed and pressed to place several times, and the surplus all trimmed away before finally mounting.

In cases where the root is broken down it must be built up with amalgam before attempting to adapt the ready-made crown.

I do not wish to be understood as advocating the use of the ready-made crown, because I do not like this variety; but I do know that many of them are used and my plea is for their proper adaptation.

Getting back again to the metal base variety of crowns there is one which I believe to be especially adaptable to the upper bicuspid in cases where the bite is rather short and hard and where we would doubt the durability of the all porcelain variety and that is the crown known by those who use it, as the porcelain faced cast cusp crown, a sample of which I have passed out. This crown may be made either banded or bandless, preferably bandless for these bicuspid as we can always use two posts in the upper first and very often in the upper second. The facing is ground the same as for a Richmond and waxed to place in relation to the coping and the entire lingual including the cusp built up with inlay wax. The facing is now removed it having been vaselined before building the wax against it; place graphite points into the pin holes in the wax, invest coping and wax and cast. Now drill out the graphite and fit the facing to place by means of cement, polish and the crown is ready to mount. In

this crown we have the porcelain facing for good appearance with the cusps of metal for durability.

Now there are cases which we meet where the upper central and cuspid roots are broken down to a point where it is impossible to adjust a band. We possibly wish to use one or more of these roots for bridge abutments and we realize that the ordinary bandless crown does not possess the required stability. In this condition a method which I sometimes employ with a great deal of satisfaction is to use a second dowel or post.

I first adapt the swaged and burnished coping and dowel in the canal in the regular way, then I drill an extra canal as it were, about $1/8$ of an inch or possibly a little more in depth at a point to the lingual and to one side of the regular canal where the diameter of the dentin is greatest and through the metal coping and into this extra canal I insert an 18-gauge and in some cases as small as a 20-gauge round clasp metal or iridio-platinum wire and attach this also to the coping with solder.

This method where it can be employed adds a great deal of stability to a bandless crown and as I previously stated is indicated in the larger roots.

I believe this to be a better method than the one of sacrificing the structure of the root by cutting steps and peripheral shelves as they may be termed.

Another case where the extra post or dowel is indicated is in those short, heavy teeth which we quite often find where it is difficult and really not advisable to remove all of the enamel in order that we may fit a band and where the root is called upon to bear the extra stress of an abutment for a bridge.

Even if this extra post in some cases can be but $1/16$ of an inch in length it adds a great deal of stability and is very effective in preventing the rotation of a crown.

Other crowns which are deserving of consideration are those where the Steele and Evslin facings are used. These are of course simply modifications of the metal back crowns and possess the advantage of being quite easily replaced in cases where the facings are broken away.

Many dentists consider this feature a decided advantage and it certainly is if we experience much trouble with facings breaking away.

In this connection let me say that the breaking away of the facing of a soldered Richmond crown I believe is not only due to the fact that the facing is not properly ground and protected with sufficient metal as I have previously stated; but the manner of bending the pins down upon the backing in a way to put a strain upon the porcelain is I believe the cause of many facings breaking away.

To avoid this strain the pins should be weakened by cutting into them at a point right at the backing, with a knife edge file, cutting into the pin $1/3$ and in some cases $1/2$ of its diameter, then bend the pins down firmly onto the backing. This will hold the backing and facing firmly together avoiding the strain upon the facing and will prevent the slight checking of the porcelain around the pins, which is liable to occur if the pins are not weakened.

I also believe that the double backing should be used in order to obtain the best results.

Another crown which I believe still has a place in this work, is the porcelain baked crown. Since the advent of the different makes of the all porcelain crown and the casting method the porcelain baked crown has in the majority of offices been relegated to the past; but in some of the long bite cases where the gum line at the labial or buccal is high and at the lingual low the porcelain baked crown meets the condition possibly better than any other.

The dental laboratory phase of crown work should be considered and still after mentioning the fact that the first essential requisite of a properly constructed crown is the proper preparation of the root and the proper adaptation of the band or coping to it, it is not necessary to dwell to any great extent upon the extremes to which many dentists go in having their crown work done by the laboratories.

The dentist should by all means, at least prepare the root and adapt the metal bases before intrusting the work to the laboratory and even then the best results can be obtained in your own laboratory, provided that you possess the ability; because each case is a law unto itself and should be constructed according to its individual requirements and the dentist is the one who knows these requirements.

Now, in conclusion, let me say that I realize that I have not in this paper given to many in this audience much, if anything that is new in crown work, and still there are those present who, I trust, have gotten ideas which may prove a help to them in their work. Aside from calling attention to and pointing out principles which must be adhered to if we would do successful and conscientious work in this department of our profession, the purpose of this paper has been and is to stimulate dentists generally to at least make an effort to do better and more conscientious crown work.

It is my belief that crown work and bridge work, which go together, is the most abused department or part of dentistry, possibly because it is a work which is possible of the most abuse, and, ladies and gentlemen, I want to impress you, if I can, with the seriousness of it.

The abuse is, in fact, so great that it is a positive menace to the welfare of many individuals who have been unfortunate enough to fall into the hands of so-called dentists who either cannot or will not construct work of even a very ordinary quality; dentists who absolutely and entirely disregard their patients' comfort and welfare, and I believe that in time, and possibly very soon, steps will be taken to protect the innocent public from this menace. Possibly as a means of protection it will come about that dental work, where at all suspicious, will be examined by competent examiners and if the work is not up to a reasonable standard of quality, or if the flagrant abuse which we so often see is in evidence, the one or ones who did such work will have his or their licenses to practice revoked.

Another factor which will compel to a considerable degree a better quality of this work is the real physician who has the interests of his patients at heart. This kind of physician, as we know, these days is examining the mouths of his patients by means of the radiograph and otherwise, and when these bad conditions are discovered and the patient is advised to have the crowns and bridges removed on account of their menacing effects it will be a poor compliment to the dentist or dentists who did the work.

I am in a position where I see a great deal of the abuse of crown and bridge work, and am impressed with its serious-

ness, and if this paper will but prove a means of awakening this audience in even a small degree to the importance of this matter and cause you all or any of you to exert your efforts in any way which will tend to lessen the abuse I will feel repaid for this effort.

PRESIDENT'S ADDRESS.*

BY L. L. DAVIS, D. D. S., CHICAGO, ILL.

The honor of presiding for a second term over an organization the character of this, the Odontological Society of Chicago, is truly a great one, and I should be recreant to my better self did I not offer to each member my sincere thanks for the distinction placed upon me by your act. To have striven to carry out the will of the body as a whole has been a pleasure, and at the close of this meeting I shall return to the ranks with just as great a desire to help the advancement of this organization as when an officer and directing its functions.

To have presided during the year 1914 carries more than usual distinction, for that year will be recorded in history with letters of red, and under the reflected light of the stupendous happenings of that period all organizations for public weal must receive honor and renown. Nineteen fourteen will mark an epoch such as never before contemplated.

The knowledge that as we sit at this table enjoying the good things provided for our entertainment there are millions of fellow mortals across the water striving their utmost to destroy each other is not a pleasant thought, but still more terrible the fact that those millions represent the highest degree of civilization attained since the world began. And in drawing its material for marking the epoch, war dips its brush in the blood of the noblest men and women of the time. As I write there seems to be a possibility of several other nations entering into the combat, and it really looks as if some biologist had discovered the war germ, cultivated it to its greatest intensity

*Read before the Odontological Society of Chicago, November 3, 1914.

and was now scattering broadcast innumerable billions among the foremost nations of the world; or that some unknown condition of the elements produced a blood lust in the mentality of the world's leaders. Certain it is that no period of history has ever marked conditions like the present. Can it be possible that more than one-half the total population of the world is at war? It seems unbelievable—a nightmare! and the more we think of it the heavier grows the heart. Our only consolation is the hope that the craze may not reach us. President Wilson's calm judgment and splendid advice to the nations as a whole adds strength to our soul.

While nations are destroying each other, it is only meet that in some peaceful country there are those whose aim in life is the prolongation of human existence, and that such ideas and thoughts are the life work of those men who sit at this table with me creates a balm that stills in part the heartsickness occasioned by the contemplation of war's most horrible results.

Prof. Vaughan of Ann Arbor, in an address before the American Medical Association in June last, made the statement that the discoveries in medicine and surgery during the last century had increased the average of man's life fifteen years, and with the application of that knowledge the next quarter of a century would mark the gain of a like number of years to man's span of existence.

I have not the slightest doubt as to the accuracy of Prof. Vaughan's statement, but cannot forbear an addendum which I am sure is just as correct, viz., the application of the laws of health, formulated by the physician, are of no value unless the field of work of the dentist be considered; that if another gain to man's span of life be made in the next decade it will be by the teaching and practice of advanced dentistry—the dentistry advocated in papers read before this and other societies during the year 1913-14.

At the first meeting of this society after my elevation to the chair, Dr. Kester, in an essay on "Immunity," struck the keynote of the times: "Immunity, or resistance to disease, is the very foundation of preventive medicine. It is the overshadowing factor in hygiene." Followed as it was at the next meeting by Dr. H. H. Schuhmann's scholarly paper on "The

Inter-Relationship of Alveolar Osteomyelitis with Systemic Disorders," and the remarks about autogenous vaccines and their indication, fully demonstrated that this field of thought is constantly and persistently forcing its attention on the entire medical and dental world.

Dr. Woolley's essay on "The Possibility of Systemic Diseases Arising in the Dental Tubules" is an indication of the thoroughness with which each phase of this all-absorbing question of the present day is being studied and investigated.

One of the most valuable papers of the year was presented by Dr. Ames on the "Possible Sterilizing Properties of Filling Materials." Accompanied by a demonstration of biological experiments showing cultures and inhibition of cultures in the presence of certain forms and makes of cements, it showed a careful and scientific study of the subject that cannot fail to impress both hearers and readers of its great value.

Another and more extended discussion of the "vaccine therapy" question was presented to the society in a paper by Dr. Schuhmann at its April meeting, entitled "The Pros and Cons of Vaccine Therapy." The essay and Dr. Miller's part in the discussion set forth in such a simple and logical manner the physiology of vaccines that all who read may readily understand the subject. More of these kind of papers are needed.

Dr. Joseph Beck's paper at the last meeting on "The Co-operation of the Dental and Oral Surgeon with the Ophthalmologist and Otolaryngologist, with Special Reference to Diagnosis," showed how fully the medical profession are realizing the close relationship to the dental profession, and more than emphasized the crying thought of the year in medicine and dentistry.

I look forward to greater achievements along these lines in the year 1915, for never in my thirty-three years of practice have I seen such an unanimity of thought and action as at present pervades the two great healing professions on this continent. May this be the germ or element to affect the mentality of those living in this part of the world.

I cannot pass without comment several notable papers presented before other societies this year. Dr. M. T. Barrett's paper on "The Protozoa of the Mouth in Relation to Pyorrhea

Alveolaris" opens up a new line of thought, and as it was only a preliminary report of work undertaken, criticism, to be just and of value, must be withheld.

Of Dr. Hartzell's research work in "Mouth Infections" there can be nothing be said but praise, and that in no weak, faint voice. Already his efforts are bearing fruit in a more comprehensive and systematic method of record keeping, of untold value in future knowledge on this most important subject.

One other tribute to a living, vitalizing, energizing and scientific worker, Dr. Weston A. Price of Cleveland, whose contributions to scientific dental knowledge and efforts on behalf of the Foundation and Research Commission bear testimony of the spirit pervading dentistry in the year 1914.

Before closing, a tribute to our departed friend and fellow worker whose presence we so much miss, a genial, loving and lovable comrade, a true friend, a willing and arduous worker in dental science, and one of this society's most valued members—Dr. George W. Cook. May he rest in peace!

PROCEEDINGS OF SOCIETIES.

THE AMERICAN DENTAL SOCIETY OF EUROPE,
FORTY-FIRST ANNUAL MEETING, HELD AT
PARIS, FRANCE, JULY 30TH, AUGUST 1ST,
INCLUSIVE, 1914.

DISCUSSION OF THE PAPER BY DR. R. OTTOLENGUI ON "THE RESTORA-
TION OF OCCLUSAL SURFACES OF MOLARS AND BICUSPIDS
WITH CAST GOLD INLAYS."

DR. M. L. RHEIN (New York):

Said Dr. Ottolengui's presentation showed the great value of the carved inlay. The value of the sulci in their true relation to each other had never before been fully appreciated in the restoration of carious teeth, and if there was no other benefit to be gained from the cast inlay the beautiful presentation just witnessed was evidence of the great advance in restored sulci, and one that could not be obtained in any other way. The field had been very thoroughly covered by Dr. Ottolengui. When the occlusion was accurately restored there was a distinct absence of the wear that was customary on the occlusal surfaces where there was a lack of absolute restoration of occlusion. The great value of the gold inlay, while resting on that particular point, also rested upon the fact that the lines of the cavity did not necessarily mean the boundary of the inlay; the extension of the lines beyond was the great assurance of the permanent value of the gold inlay over any form of restoration that had been used in the past. One thing had been observed in the United States, and no doubt the same thing was true the world over, namely, that just as soon as anything new was produced a great mass of practitioners looked upon it as an easy road to the accomplishment of something, with the result that there was a flood of operations connected with gold inlays, which meant a mass of gold lying in a body of cement. That was bound to be just as much of a failure in the future as any imperfect restoration. The merits of a thing should not be judged by the abuse to which it was put.

DR. H. W. C. BÖDECKER

Said it was possible not only to restore but to improve Nature with the inlay, and Dr. Ottolengui seemed to be quite aware of that point. Where there were abraded surfaces of teeth he believed it was perfectly right and more than justifiable to accentuate the cusps as much as possible. When a man had lost his leg there was no objection to giving him a good wooden leg, and not a leg as weak as the one he had lost. He believed in all cases the most perfect of occlusal surfaces was none too good for a case, and by perfect he meant a surface which performed its physiological function to the highest degree. The doctor had called attention to the fact that the masticating surface had what might be termed spillways for the overflowing of the masticated food, so that the food could never get to the interproximal space, and he thanked the doctor for bringing that point forward. With regard to the interproximal space and the contact point he did not know whether he had quite understood Dr. Ottolengui. By broadening and deepening a contact point he did not know whether the doctor meant that the contact point became a facet or a simple contact line. A contact line he believed would cleanse the spaces. Where there had been inflammation in the interproximal space, and it had been necessary to restore with inlays he had invariably altered the form of the interproximal space, bringing the contact points somewhat higher. (Drawing.) He found that the gum rapidly recovered because more self-cleansing space was provided than normally. That again came back to the point that an inlay could be used not to restore Nature but to improve Nature. There were some cases in which two proximal cavities, molar and bicuspid, had both become carious and owing to pressure the bicuspid had tipped over. In such a case it was difficult to restore the contact point, and he had found it of great use to change entirely the form of the contour and contact point, not by separating the teeth and again increasing the pressure at the other contact point, but simply by trimming down the teeth and making the inlay with a less pronounced contour. He had had cases of teeth in infra-occlusion, one case being a lower molar with a bicuspid slightly tipped and bearing against the anterior surface of the molar, and caries had begun in the occlusal surface. He cut away the tooth and prepared a cavity and then built up with an inlay a new occlusal surface having a

different direction but in perfect occlusion with the upper tooth.

DR. E. A. BOGUE (New York)

Wished to thank Dr. Ottolengui for a marvelous presentation of a thing which two or three years ago he should have supposed to be impossible.

DR. W. A. SPRING (Dresden)

Believed that the practice of every dental surgeon would be more or less influenced by the beautiful illustrations and descriptions of the wonderful grinding surfaces Dr. Ottolengui had produced. His own practice had been certainly very much influenced since reading the paper by Dr. J. Lowe Young. It was necessary to pause and think for a moment whether it was always advisable to cut away surfaces of a tooth to make an inlay when a comparatively small filling would save the tooth. He had seen many cases where an inlay had been constructed which was very beautiful but where a large surface of the tooth had been unnecessarily removed. He was somewhat shocked when he read of certain practitioners in America having thrown away their pluggers, and he was wondering whether the pendulum would swing back a little bit. The method of constructing inlays as shown by Dr. Ottolengui was a grand advance and he could only express his appreciation of it.

THE PRESIDENT, DR. W. DAVENPORT

Said the paper illustrated a characteristic of Dr. Ottolengui, the thoroughness of the work he undertook. The question of the details of a surface to a sculptor had been the study of the great artists of the world, and any man that could carve the lines of a tooth properly was equal to Michel Angelo or any other great master of art. He had been specially interested in model No. 5, the inlay that had been built right across the line. He should have imagined that would prevent the normal swing of the jaws first expressed by Dr. Bonwill and many others. With regard to the posterior-anterior valley of a tooth, if a man was an artist he could not help but make such a valley, and he had seen men who would find it impossible to restore teeth without carving such a valley.

DR. OTTOLENGUI

In reply to Dr. Spring said that in the last illustration shown on the screen at least two of the restorations were gold foil fillings, and, as he had said, it was a mistake to allow boys to carve up ivory

teeth and then use them as models for inlays, because they could not restore absolute tooth form. That applied also to cutting away. The best of men could never put back absolutely what had been destroyed. It was a mistake to cut away a good deal of tooth for the pleasure of inlaying when the tooth could be saved with a small filling, but he would not hesitate for a moment to cut away if he could not prepare the small filling in a manner that would not interfere with the effectiveness of the tooth. With regard to contact points, he quite agreed with leaving a self-cleansing space where the gums had been disturbed. In speaking of widening the contact point he was afraid that Dr. Black used a bad simile when he spoke of contact points being like marbles. They might be like marbles in the anterior teeth but when studied carefully in molars they were not so. He believed as a fact that food would gather between two gold surfaces more readily than between two enamel surfaces. When he spoke of increasing the contact width gingivally he meant very little towards the gingival but a closer contact above, closing it up as much as possible to prevent the ingress of food. Nothing in his practice had given him a greater pleasure and interest in his work or led to more appreciation on the part of patients than the method he had described. One of the cases he had shown was that of a lady who was now going about examining the mouths of her friends. When a friend said she had a number of gold inlays the lady put a mirror into her mouth and immediately said they were inlays, not restorations.

NORTHERN ILLINOIS DENTAL SOCIETY.

DISCUSSION OF DR. HARPER'S PAPER.

DR. M. L. HANAFORD, Rockford:

The essayist is to be congratulated on his cheerful optimism as shown in his paper. Compared with some former utterances on the same subject, the change is truly remarkable; for we find him saying in a paper read before the State Society two or three years ago, that with the same alloy, same conditions, and same technic, he was unable to produce the same result twice in succession.

His present confident way of expressing himself on the subject is truly refreshing and argues well for the betterment of our operations in amalgam.

That faulty technic is at the bottom of most of the failures of amalgam fillings, no one can doubt, who has had any considerable experience.

To locate a large, probably the largest, proportion of the failures, however, the investigator does not need a micrometer or the air test. They are so evident that they fairly scream at you the moment you look into a patient's mouth. Dr. Harper assumes that dentists do their mechanical work well, according to the best enlightenment they can get. He is assuming too much, and it is my opinion that some one should preach a long and very earnest sermon on such trifling matters as the necessity for keeping the field dry by rubber dam, the thorough excavation and proper formation of cavities, shaping, contouring and finishing of fillings—as a prologue to Dr. Harper's paper.

But that aside, the main surprise to me in the paper is the statement as to proper consistency of the mix of filings and mercury. To say that the mass should be soft almost to "sloppiness" sounds revolutionary, and then to add that there should be no suspicion of "crepitus" takes us even a step further, for in my experience—and I have been trying since receiving the paper to follow the essayist's technic—"crepitus" can be heard and felt right up to the point of "sloppiness," which yields a mass too soft to "stay put." I know Dr. Harper has given unselfishly of his time and undoubted talents, to this subject, and we should not lightly reject a pronouncement which does not agree with previous supposedly authoritative statements, and if in our efforts to get away from "sloppiness" we have been working our amalgam too "dry," we must gracefully change our method and in the future work with softer material. I would only ask for a more definite test while kneading than the entire absence of "crepitus," which seems to me to necessitate "sloppiness."

Dr. Harper's time limit for rubbing in mortar and subsequent kneading is longer, probably twice as long, as most operators have been in the habit of giving to it, and here again we must accept the verdict of the air test, and if an alloy manipulated two minutes and one minute respectively, and introduced in a soft, almost

"sloppy," condition shows the best adaptation in the large average, the question is settled for all time.

We owe Dr. Harper a large debt for the untiring persistence with which he has stuck to this problem, and his findings should be treated with respect and accepted, whenever he speaks with positiveness.

DR. P. J. KESTER:

Not having had the opportunity to read Dr. Harper's paper until my arrival here, I did not know just what he was going to say.

But the subject, "Deficiencies in Our Amalgam Technic, with Suggestions for Its Improvement," prompted me to take a few notes from my records on the same subject made during the summer of 1898. After reading his paper, I still feel justified in referring to them at this time, as Dr. Harper's conclusions coincide with my own, and his statement that the stability and adaptability of an amalgam depends on a proper technique is fundamental and true.

There has been some false teaching or teaching of false technique lately. I refer to a gentleman who advocates what I believe to be an imperfect mix. And I agree with Dr. Harper that the so-called bulk changes are due to the imperfect mix, and I think he will agree with me that the time required to make a perfect mix of a high grade alloy will depend somewhat on the cut of the alloy, as to whether it is file cut or shavings, the file cut requiring an appreciably longer time than the machine cut alloy.

But to return to my notes.

Hundreds of mixes were made and the different kinds were classified as follows:

1. *Ordinary mix.* 2. *Ordinary mix with the mercury squeezed out hard.* 3. *Imperfect mix.* 4. *Insufficient mercury.*

No. 1. Ordinary Mix. In this the amalgam was mixed in the ordinary way first in the mortar and then kneaded in the hand until quite plastic. The apparent excess of mercury was squeezed out between thumb and fingers, and the cubes made. The slight excess was scraped off the matrix. These blocks were then tested as to their crushing strength, and took the limit of the instrument, which was 450 pounds.

No. 2. Ordinary Mix (with mercury squeezed out hard through a linen cloth). These blocks lost 100 pounds. This mass

was made exactly as in No. 1, except that the mercury was squeezed out.

No. 3. Imperfect Mix. This mass was mixed in the mortar very hurriedly and the mass squeezed together without kneading in the hand, and the blocks made in the usual way. And these blocks lost another 100 pounds in strength.

No. 4. Deficient in Mercury. These blocks were made with the smallest amount of mercury sufficient to make a semi-coherent mass. These blocks crushed at about 100 pounds. As it has been shown that the average pressure of the human jaw is about 150 pounds, it can be seen that such a mix would be valueless as a filling material.

Our conclusions at the time were that an alloy required a sufficient amount of mercury to completely amalgamate the mass, and to get the best results more time should be given to the proper preparation of the amalgam. Dr. Harper has certainly given us many valuable suggestions as to how this should be done.

CHICAGO DENTAL SOCIETY.

A regular meeting was held November 17, 1914, with the President, Dr. T. L. Grisamore, in the chair.

Dr. L. Willis Strong read a paper entitled "Fixed Bridge Work."

Dr. R. E. MacBoyle read a paper entitled "Individual Crowns."

DISCUSSION.

DR. D. A. HARE:

I have only words of praise and commendation for these two papers. In fact, they so fully coincide with my own ideas of crown and bridge work that it leaves me very little to discuss except to emphasize some of the points brought out in the papers. I was very glad to notice there was so much stress laid on the hygienic point in the construction of crown and bridge work.

In the last few months I have been going into the subject of oral prophylaxis rather fully, and am free to admit that my ideas on the construction of crown and bridge work have materially changed during that time. As we all know, physicians are beginning to recognize the importance of clean mouths, non-irritating

crowns, non-irritating bridges, and possibly they are going to the other extreme now in advocating no crowning at all, but rather lose the teeth altogether than to have infected irritating conditions in the mouth. This is not necessary by any means, because with our present knowledge of crown and bridge work we can construct non-irritating crowns in such a way they can be kept in a hygienic condition. Regardless of the kind of crown we use, it seems to me that the fundamental principles and the basic requirements of crown work are to construct something that will not irritate the soft tissues, and can easily be kept clean. That involves preparation of the root and the fitting of the coping. Regardless of the crown we use afterwards, I think those two points are the first to be considered and are the most important. For that reason I have followed a method of preparing the root and fitting the coping on the majority of the anterior teeth and in bicuspid as well, which has given me better results than the banded cap. That is, the facing and slight beveling of the root and squaring of the pulp chamber in such a way that we will have an inlay effect in connection with our post. After the root is prepared in that manner, an impression is taken, then a die and counter die of Melotte's metal run up and a cope swaged of thirty-six platinum which can be carried to the mouth and fitted over the root perfectly. In that way you get a crown with a positive seat. There is no movement whatever, and when finished, it goes to a certain place and is well adapted to the root. Then in fitting the coping over the root, about a millimeter of the platinum is allowed to overlap. This can be easily burnished over the periphery of the root, leaving a slight band going under the free margin of the gum, which can be perfectly fitted to the root, and which will be absolutely non-irritating after the crown is finished.

The question of facings was brought out by Dr. MacBoyle and from what I can gather, he favored the soldered facing. I have discontinued the use of soldered facings for some time, for several reasons. With a cemented facing you get all the advantages of the soldered facing, and in addition, to my mind you gain increased strength and the facing is always under your control even after the crown is finished. If everything is not satisfactory you can change it, add more porcelain or strengthen the cutting edge. In fact, you can do anything you wish with it until the crown meets

with your approval. With a bicuspid crown especially, a cemented facing has given me better satisfaction than any other, for the reason that with this crown we need something that is going to be hygienic, strong, and meet all the requirements of the esthetic. The cemented facing bicuspid with cast back to my mind meets all of these requirements. True, we have a little additional gold, but to offset that we have a strong crown, with a coping that is nicely adapted to the root, so that it will be non-irritating, and a facing that can be easily altered and is completely under our control.

I was sorry no mention was made of the porcelain jacket crown. It is true that the places where this crown is applicable are somewhat limited, but in those places there is no other crown that meets all the requirements like the porcelain jacket crown. It is by far the most hygienic crown we can construct. It is strong, and as far as esthetic effects are concerned, we cannot duplicate it in any other that I know of.

There was a point brought out in Dr. Strong's paper on bridge work that I do not agree with altogether. He said the impression was given at the clinic last March, at the Golden Anniversary of the Illinois State Dental Society, that the accepted form of abutment for bridge work was a replaceable porcelain crown. I do not know whether it was the intention of the committee to give that impression or not, but if it was, I think it was a mistake, for the reason that to my mind a replaceable porcelain crown for dummies and bridge work in the majority of cases is not a success. I say this from the hygienic standpoint, especially the dummies posterior to and anterior to the abutments. In order to have a strong dummy in porcelain you must have bulk, and when you place a bulky porcelain crown adjacent to an abutment and get sufficient strength with the gold, you are impinging on the soft tissues and filling a space that should be left there for self-cleansing purposes. By using a facing for the same case you can utilize the space occupied by porcelain with gold, which gives you additional strength, the same esthetic effect, and leaves sufficient clearance to keep the case in a healthy condition. The success of a bridge, as you all know, naturally depends upon healthy and strong abutments. Now, then, it behooves us to consider what is the best way of preserving the health and strength of these abutments. We can only do it by constructing abutments and dummies that will not irritate the soft

tissues and that will enable the patient to keep the bridge in a perfectly clean and healthy condition.

I do not know of anything else that I can speak about just now. Probably some of the other members will bring out points I have not mentioned or noticed.

DR. M. L. SCHMITZ:

The new era of oral hygiene has brought crown and bridge work under criticism, especially by some leading men of the medical profession. But the accepted principles of this branch of our profession need no defense; those men only of our profession who carelessly and deliberately ignore these principles are the ones to be criticized. The conservative dentist must blush with shame when a medical man presents a patient with a specimen of the skilled manufacturer of a "miniature gold tomato can" forced over an unprepared tooth.

The message brought to us tonight by our essayist is a plea for a study of the literature on and the close adherence to the many principles of and indications for bridge work.

Any intimation that it is good practice to place a shell crown on a vital tooth will raise a storm of protest. The theory that the dental pulp has served its usefulness when full development has taken place is hardly acceptable when we consider that the profession is at this time making a plea for the conservation of the pulp in operative dentistry.

This brings before us the possibilities of saving the pulp in a tooth that is to serve as a pier for a bridge. The restoration of a single missing lateral, suspended from a vital cuspid by a hood attachment, is an instance. Again, in mouths of middle-aged patients in need of bridge work, a molar of favorable shape, with evidences of secondary dentin formation, permitting the proper preparation without shock, which on the other hand would present difficulties to perfect root-canal work.

In the treatment and filling of root-canals our first and perhaps greatest responsibility begins. Septic apical conditions have done as much to discredit crown and bridge work as have the ill-fitting bands. Pulp canals should be protected as much as possible from oral fluids while constructing the work. After a canal has been enlarged for a dowel it should be kept sealed with a germicidal remedy between visits of the patient. If teeth

that have been previously treated and canal fillings placed, are to be used as bridge pieces it is wise to thoroughly investigate them either by X-ray or other means to determine the condition of the root work. If the work is found unsatisfactory it should be done over. Even if it proves to be well done it is wise to seal the tooth with a penetrating germicidal remedy as for instance a formaldehyde preparation.

The ideal bridge attachment is one that presents absolute continuity of surfaces of attachment and tooth or root. This is especially true in mouths with a tendency to pyorrhea or where pyorrhea treatment has been instituted. I have cause to regret the use of any kind of band in these cases. Five years of association with a gentleman, who specialized in the treatment of septic oral conditions, has convinced me that bands near or under the gum margin, even though the fit be all that could be desired, are not indicated.

Sufficient attachment can be had by means of interdental bands, partial crown, or hood attachments with or without dowels and inlays. In this class of cases it is desirable to preserve as much as possible the natural crown of the pier teeth; but if necessary to sacrifice the crown of an anterior tooth an interdental band form of attachment will serve well. This was first suggested by Dr. B. J. Cigrand.

The hood or Carmichael attachment lends itself well in preserving the natural tooth as well as inlays with posts. The inlays at all times should be so constructed as to prevent injury to the tooth; this is especially true of bicuspid.

When a technique and perhaps special instruments have been devised for the preparation of a tooth with a definite margin as for a porcelain jacket crown, then an ideal form of attachment can be made. It is extremely difficult to so prepare a molar or even a bicuspid.

In mouths not subject to a tendency to destructive diseases of the tooth supporting structures the beautiful crowns of Dr. MacBoyle's descriptions are indicated.

Perhaps the ideal in bridge work would be attainable in the form of a fixed removable bridge, if the alveolar ridge did not absorb from under the saddle placing all the stress on the pier teeth, notwithstanding a theory advanced of a physiological

pressure attainable that prevents the absorption and causes a permanent condition of the alveolar ridge. I wonder if it can be a psychological pressure which prevents the natural absorption of a transient structure such as alveolar bone.

In summarizing I wish to emphasize Dr. Strong's salient points:

1. Aseptic root apices.
2. Perfect preparation of pier.
3. Perfect fit of attachment.
4. Hygienic requirements.
 - a. Good contact point of abutment crown with approximating tooth.
 - b. Narrow dummy cusps.
 - c. Sufficiently wide embrasures.
5. Strength and esthetic requirements.

DR. E. A. CRANE:

The essayaists have told us in their able papers most of the essentials of crown and bridge work. These are important subjects, however, and there are several factors worthy of further consideration.

In his book on "Principles and Practice of Crown and Bridge Work" Dr. Goslee says: "The relation existing between the crown and root is of the greatest possible importance, because the ratio of subsequent failure or trouble arising from the progress of caries, or from gingival or peridental irritation, is decreased in proportion to the degree of accuracy in the adaptation."

How often do we find crowns with bands extending to the process on one surface of the root and not to the gingival on the other; the gum is in a state of hypertrophy and the tooth practically useless, so far as mastication is concerned. Other cases often present where the margin of the band does not fit the root snugly at the gingival, owing to negligence in preparing the root, leaving a space between the band and root of about one sixteenth of an inch or more, which upon setting the crown, impinges upon the gum tissue, and later forms a place for lodgement of foodstuffs; and ultimately the loss of the tooth by caries or pyorrhea.

Undoubtedly we have all had patients tell us how other

dentists had to take a mallet and stick of wood to drive on a crown, and upon examination of the crown we can readily see why it was necessary to resort to the mallet and stick. I can speak from personal experience on the subject of mallet and stick, as some years previous to my entering a dental school I had a crown set with what seemed to me to be a log and a sledge hammer. The crown is not in my mouth at the present time.

We find in all of the writings of men of authority on the restoration of teeth to their natural usefulness, either by crown or filling, that the greatest subject is the restoration of the points of contact. If an operator is not able or will not take the time to contour a crown so as to restore the normal approximation to the adjacent teeth, he had far better let the crown remain out of the mouth than to cause the patient undue suffering and the loss of the tooth tissue and process by his negligence.

Removal of all excess cement from beneath the margin of the gum is essential; and the presence of this is another cause of failure. It is no wonder there are so many failures in fixed bridge work when we stop to consider the methods employed by a great many operators, who depend upon the dental laboratory to furnish all of the brains and mechanical ingenuity to construct their prosthetic pieces.

The practitioner simply grinds down the roots to be used as abutments for the bridge, taking a wire measurement of the roots, a modeling compound impression and a mush bite of beeswax that in some cases has seen considerable service. Then all this is sent to the laboratory, with an order to have a finished bridge returned the following day. What must be the ultimate outcome when a practitioner becomes so negligent as to not even construct the bands and copings of crowns and try them in the mouth to see if they fit or are properly aligned, but allows the work to be constructed entirely upon a plaster model by a laboratory operator?

Do not understand me as condemning dental laboratories—far be it from such. I consider a dental laboratory, conducted by a mechanical dentist, who is conscientious and who does the work himself, with the advice and consultation of the practitioner, a boon to the busy dentist.

In closing, I desire to congratulate the essayists upon their splendid papers. Both are worthy of our earnest consideration.

Dr. L. H. Arnold:

We take it for granted that everybody in this hall knows that a band must fit; we take it for granted that everybody here knows also that a crown ought to be contoured, and we take it for granted that everybody knows there are not as many crowns contoured as ought to be, and yet contouring is one of the most important points in connection with crown work. Contouring preserves, as all know, the soft tissues between the teeth. The soft tissues between the teeth are the tissues we are battling to save in our efforts to stop pyorrhea. Therefore, contouring is the first step in curing much pyorrhea,—and it does not need many instruments for this method of treating pyorrhea either. To my mind there was not enough said about the porcelain jacket crown. Dr. Hare alone mentioned it, and he restricted it, if I understood him correctly, to the six anterior teeth.

Dr. Hare:

I did not restrict it at all.

Dr. Arnold:

I believe it is not necessary that it should be restricted. In many cases it is difficult to make a good porcelain crown for a molar tooth, but they can be made and made to fit for any of the teeth in the mouth. One of the advantages of the porcelain jacket crown is that one of the laws laid down by every speaker, I believe, may be disregarded and that is, you should never set any kind, sort or description of shell crown, over a live pulp. Do not misunderstand me. No *metal* shell crown *should* be set over a live pulp in any case I can think of other than that mentioned in the papers. The reason a porcelain shell crown differs in this respect from a metal shell crown is that the former is a nonconductor of heat as is the natural enamel removed and consequently with the natural lost enamel, replaced by a good non-conducting porcelain jacket crown, the pulp of the tooth is just as well protected as in the first place, provided the joint at the gingiva is perfectly good. I know of several men who have put on many of these crowns and have had very few inflamed pulps on that account. I have put a great many of them on myself,

and the other fellows may have seen my failures if I have made them. I have not seen many.

One thing that has come to my mind very forcibly lately because of some of my own failures has been the use of inlays for abutments for short bridges as mentioned in the papers and Dr. Strong's advice of a cusp narrow mesiodistally for bridges should be observed. That is a good point, and I would like to add that the inlay should be made wide,—to cover a large portion of the occlusal of the tooth. One case I recall is a one tooth bridge with inlay abutments, one in a bicuspid, the other in a first molar and the bicuspid tooth was split in two in a year or so. If my abutment had been considerably larger that would not have occurred; so that there is another point to consider in connection with these inlay abutment bridges; that is, not only to make the cusps narrow mesiodistally but get the inlays very large, and on a small bicuspid it is questionable whether it should not be a crown abutment rather than an inlay. The triangular lower surface for bridges is also good. It can readily be kept clean, and I think will be found to be a very satisfactory method of construction.

The two papers are very good, and inasmuch as they have been read by men we have not frequently heard before, they are particularly acceptable, and I congratulate both gentlemen on their papers and the very excellent points they brought out so clearly.

Dr. Strong (closing the discussion on his part):

There is only one thing I wish to say, other than to thank the members for the manner in which my paper was received, and that is to correct an impression left with Dr. Hare and possibly with a good many others as to the use of porcelain dummies. I believe you will find in my paper, where porcelain is mentioned, the statement, porcelain teeth or facings, and where the teeth are too clumsy and take up too much room to be used, you may use a gold cusp surface, with replaceable or cemented facings. I do not believe it was the idea of the clinic given at the anniversary celebration to convey the impression that porcelain teeth were to be used in all cases, and I certainly do not want to leave that impression in your minds from my paper.

DR. MACBOYLE (closing):

I simply want to thank the gentlemen who discussed my

paper for their kindly consideration of it. I thought possibly we might start a few arguments, but evidently they were not started.

Dr. Hare spoke of banded crowns as though he did not favor them. In my paper I said there were places where I certainly favored the banded crown, where the band was first fitted and the coping made by soldering the floor to it. Where I personally have had very good service from that kind of construction is in those cases which I mentioned where the teeth are short and there is a hard bite, and especially where I am using that as an abutment for a bridge. There is nothing in my practice that has given me more satisfaction than the banded crown in such cases. For the individual crown, as I stated in the paper, I do not believe in adhering to the method of fitting the band and making the coping in that way. In that relation I might say the tendency of the swaged coping is to spread under heavy stress in some cases, but not in all, by any means. The same thing I spoke of in regard to the seamless crown. I consider a band fitted around the periphery of the root, properly adapted, running around the periphery of the root the same as a hoop does around a barrel, stronger and will stand more stress than will a swaged coping under heavy stress. For single crowns a swaged coping in the majority of cases is sufficiently strong, but where you want an anterior abutment for a bridge under heavy stress, I still believe that the fitted band and coping made by fitting the band and soldering the floor to it is the stronger.

In regard to Richmond crowns, as I said, we all know the Richmond crown is necessary in many cases, whether you cast it or solder it is simply a matter of choice. There is a possibility, however, in soldering a Richmond crown with eighteen karat solder, as we do on the lingual, it is a harder gold and will stand more stress of occlusion than will the cast gold. That is a possibility. Personally, I have derived a great deal of satisfaction from the use of the old-fashioned Richmond soldered crown. I am making more of them now in these cases of hard, short bites, and especially in bridge work, than I did a few years ago. But it is purely a matter of choice whether a man casts or solders. The possibility is, as I say, that in some cases 18-karat solder will give you a more dense surface than will the cast metal.

ODONTOLOGICAL SOCIETY OF CHICAGO.

A regular meeting was held November 3, 1914, with the president, Dr. L. L. Davis, in the chair.

CASE OF CLEFT PALATE COMPLICATED WITH INFECTION OF THE NASAL PASSAGES OF ANTRAL ORIGIN.

DR. TRUMAN W. BROPHY:

I show you a patient on whom I have operated, and I will state in brief the condition he was in when he came to me. He consulted me with a view to having an operation made for the closure of cleft palate. I found he was suffering from infection of the nasal passages, of antral origin. The left antrum was discharging, and I had a strong suspicion that the other was involved. I made an operation on the antrum, when I discovered the frontal sinus on that side was also diseased. After entering the frontal sinus I found great quantities of pus present; I curetted the sinuses, also the antrum on that side, and entered the antrum on the opposite side. I found the disease involved both the right and left antra. I also found the frontal sinuses involved, and later, after the four sinuses were opened and curetted, I discovered the sphenoidal sinus was involved.

To look at this man's face you would not suspect that the frontal sinuses had been opened, as no scars are visible. In looking underneath the eyebrow you see a little line, and on examination with the finger you find a little opening beneath the skin, in the bone, which was made for the purpose of getting into the frontal sinus. Beneath the supra-orbital ridge I made an opening for the purpose of removing the infectious fluids from the frontal sinus. The antrum on each side was opened underneath the lip through the canine fossa, as indicated by my finger.

After doing this I took him to Dr. Will Walter, who examined and treated his nose. We succeeded in abating the suppuration. The suppuration here was so great that it was a miniature Niagara Falls, the pus gradually running down into his throat. The man was anemic. He was suffering from pyemia. His color was yellow. He was in a wretched state. After I arrested the infection

of the sinuses I made an operation on his palate, with the result which you see.

In the early discussions of this subject in dental and medical societies, it was said that operation upon the palate for an adult, especially where there was a broad cleft, as broad as this, would be found extremely difficult, if not impossible; that the palate would be so short, so thick and so clumsy that it could not possibly perform its functions. I made this operation for him, and the palate was somewhat shorter than I wanted it. I proceeded to make it longer. I will let you examine it and see how long it is. We succeeded in getting for him a good palate. He has gotten rid of the infection. He has also gotten rid of the artificial palate and speaks with a very good intonation. Of course, the habit he formed early has not fully been overcome, but by asking him to repeat some of the consonants difficult for those who have defective palates, you will see how well he does it. (Patient was asked to say T, K, S, G, etc. Patient did so with a slight nasal intonation, but nevertheless the letters were enunciated very distinctly.)

You will see the azygos uvula. I picked up the palato-pharyngeal muscles on each side and freshened them as far as I thought was best, and brought them together and united them so as to make the palate longer. You see there is perfect adaptation. The palate comes in perfect contact with the posterior pharyngeal wall. He talks clearly and distinctly.

The vice-president, P. J. Kester, then took the chair, and President Davis delivered his address.

DISCUSSION.

DR. J. G. REID:

There is very little to discuss in the president's address. He has performed one of his duties, namely, to review the work of the society each year and comment on it. His comments on the work that has been done in the scientific world this year have not overestimated nor overstated what has been done. In fact, he may have underestimated what has been accomplished.

His lengthy comment on the war we all are familiar with, which we all discountenance and regret, and we all feel grieved as much as he does. Personally, being a Britisher, he feels more deeply

about these things than we do, being interested as he is, which is right.

I think that in the past and coming years we seem to be progressing in a more scientific manner in our study of things that pertain to our calling, and we are beginning to learn the necessity of a deeper and more investigating knowledge than we have had in the past, and we have men that are qualified to carry on that work, and the president, in calling our attention to it, did well, as it is significant at this time.

I congratulate the president on his work and his review of the work of the society.

DR. C. N. JOHNSON:

There is not much to discuss in the president's address, but I am impressed with one remark he made in speaking of the present situation in Europe. The president made the statement that the most civilized nations in the world were today at war, and that raises the question as to what is real civilization. I cannot admit, with all the admiration I have for the development of science and art in Europe, that Europe today represents the best civilization. I made a statement after being over there and looking over the situation, that my ideals of civilization had been set back a thousand years by the spectacle presented by the situation in Europe today, and I do not believe that we can call it the best civilization. I do not believe it is a demonstration of civilization. Now, when I make that statement I am not arraigning the common people of the countries at war. I feel in my heart of hearts that the common people of every country were opposed to that war, and this war, to my mind, is simply a reflection of a system that cannot very much longer exist in human government. I do not want to discuss this war question at this society, but when I am told, as I have been told many times, that the civilization of Europe represented the best civilization we had, I cannot agree with that in any sense at all. I believe the most favored place on the top of the earth is the North American continent. I have been to other parts of the world, and I come back here and that is impressed on me more and more. To my knowledge, there is no place where an individual can pursue happiness and liberty to the same extent he can on this North American continent.

In regard to the scientific work done during the past year, in

several respects there is a trend of thought that is going to be very significant for the future development of the profession, and the thing in that connection that impresses me more than anything else is the community of interest that is developing between the dental profession and the medical profession so far as the welfare of the patient is concerned. I believe the best interests of the people are to be served by community of effort between the two professions, and we welcome the advice and counsel of the medical man. I believe that when it comes to the methods of diagnosis and so on, the medical man has a broader view than dentists ever have had, and we need that broader view. I believe there are many things that are significant today that are developing, such as vaccine therapy. We do not know what there is in it, but there is a possibility in it, and I believe also the work mentioned by the president that is being done by the National Research Committee of the National Dental Association is to be of inestimable value, and there is another thing in that connection, Mr. President, I would like to refer to. It is something unique, I believe, in human endeavor, and that is this, a series of investigations in research work being carried on by contributions from the profession itself and no endowments from the outside. I know of no other movement in this particular kind of work in medicine or dentistry that has been fostered financially to the extent of this movement inaugurated by the National Dental Association, and I believe that is an accomplishment of which the dental profession may feel proud, when its members will go down in their pockets and develop a fund, which is a substantial fund, to further this research work. If we analyze that, we will see that it is one of the most unselfish acts on the part of members of any profession, and I am not boasting about my profession in saying that.

I am in hopes that a little later the example set by the dental profession in its utilitarian, philanthropic and humanitarian sentiment will be such as to influence the moneyed men of the world to create a sufficient endowment so that the profession will not be burdened by this financial aspect of the case; that that work will be fostered financially by men who have ample means and who will only require a demonstration of the fact that it is work which is needed in order to have it financed.

A very encouraging feature of our organization has been out-

lined by the president in considering the scientific work done by this society. These papers, as I look back over them, have been significant; they are landmarks in the way of progress in the solution of some of these things. I hope we will keep up this spirit in the society and develop it more and more.

DR. TRUMAN W. BROPHY:

Dr. Johnson has spoken so fully on this subject that I hardly feel that I am able to say anything that would add value in the way of discussion. All that our president has said in his address has impressed me very much. His remarks on the value of original research work are very appropriate, and I think the spirit of scientific progress has taken a deep hold of our profession everywhere. What Dr. Johnson hopes may come, I am sure ultimately will be realized. There is an order of things that always brings about the results that are needed, which we hope to see realized; and that is, what is wanted in this world, what mankind needs in this world, will be produced in some way. The necessities will be supplied. That is an order that has been in existence, I think, from the beginning of time, and I believe that this call upon the part of humanitarians will not be in vain. Men who have means at their command to employ for the well-being of humanity will assist in this work, and the hopes and the aims of those who have worked earnestly and prayed for the achievements that have been outlined will be realized. We need to be patient, and yet we need, as Dr. Johnson, has remarked, to consecrate ourselves to this great work, a work that will to the greatest extent hasten its consummation.

I do not feel like entering into a discussion of the horrors of civilized Europe. These horrors were so deeply impressed upon me while I was among them that I shrink from giving them thought. They imbedded themselves into every fiber of my organism, so that I am unable to shake them off. A man, ever so stoical and capable of standing up against tremendous horrors, could not witness such scenes as we witnessed without being impressed with not only the gravity of the situation, but with its terrors.

While we are enthusiastically working for the betterment of our fellow man in the development of the higher and intricate sciences of our calling, and while medical men now have taken up the subject, I think I can say that the pendulum is likely to swing too far. I think that already there are men who have

grown overenthusiastic on this subject of oral hygiene and prophylaxis; they have already grown into a belief that too many of the maladies to which the human family is subject are attributable to oral lesions, when the question arises as to what the causes of these maladies are. It has grown so, even among some of the best medical men, that anything they do not well understand they attribute to some oral infection, and so the mouth is being charged with giving origin to many diseases which I have no doubt have their origin elsewhere. This may seem an unexpected remark for me to make, because I have always held that the mouth, more than any other part of the body, is a source of infection, and it is the center of many diseases which have not been well understood.

I deeply regret it was impossible for me to be here at the last meeting. I looked forward to that meeting for months with most delightful anticipations; with a feeling that it would be so satisfying to me to be here. I was on the program at Des Moines, Iowa, at the Tri-State Medical Society meeting. That meeting was regularly fixed two weeks before our meeting here. By reason of the Missouri State Medical Society meeting at that time, it was deferred for two weeks and came exactly at the time of the Odontological Society meeting. I wanted to hear Dr. Beck's paper; I wanted to discuss it, because I know that many of the diseases that have origin in the mouth, the rhinologist and laryngologist does not recognize, not because he does not want to recognize them—he wants to do the right thing—but he does not. Let me put the question in this form: Medical students have not an opportunity in the curriculum laid down by the medical school to acquire a knowledge of the diseases incident to the teeth, diseases which arise in the teeth, of the teeth, and from the teeth. They cannot comprehend the conditions, therefore, that have direct origin from them. It is not a fault of theirs, but the fault lies in the medical curriculum. Consequently, these men who intend to do everything in their power to relieve their patients fail to recognize the morbid conditions which begin in the teeth and which manifest themselves elsewhere. Very numerous are these incidents in practice.

Just this morning I met a celebrated laryngologist who told me that at a discussion a few nights ago the subject of empyema of the antrum was considered. At this meeting they discussed the Denker operation, the Ballenger operation, and many other opera-

tions. His remarks impressed me with a lack of knowledge on his part of the true pathology of the teeth and the diseases which are dependent upon them for their origin. Now, I am not going into a discussion of this subject, but I do want to say this: If I had it within my power to impress upon laryngologists the importance of a knowledge of dental pathology, so far as their work is concerned, and if I were able to impress upon the medical colleges of this country the importance of imparting such knowledge to students, I think I would do the greatest work I have ever done in my life. This eminent man said to me: "Doctor, I am interested in what you said in the paper you read to us some little time ago, on the origin of empyema of the antrum, so let me ask you: "When a tooth is loose, is that evidence that it may affect the antrum?" I replied, "No, not necessarily; it might become loose from trauma; it might become loose from disease; the disease might involve the surrounding tissues, and it might be within the tooth. There are so many different conditions that I cannot tell you here all about them, but the common cause of empyema of the antrum is the formation of dento-alveolar abscesses." He said, "Do you kill the nerve?" I answered, "With a dento-alveolar abscess, the pulp of the tooth, which you no doubt refer to as the nerve, is dead." He said, "Oh, it is dead; and then how does that affect the surrounding part?" I said, "After its death it decomposes, the products of decomposition pass out of the end of the root, cause an infection of the pericementum, an abscess forms at the end of the root, and then this abscess discharges into the antrum." "Oh, is that it?" "Yes."

I cannot approve of the Denker operation, which means cutting out the whole mass of the naso-antral wall and making the antrum and nose one cavity; then the dust and dirt and accumulations from the street go into the antrum; besides, the secretions become encrusted within it and lead to constant irritation.

A patient who was in the hands of one of our most noted laryngologists for several months, for whom the naso-antral wall was punctured and the antrum irrigated, was brought to me in consultation recently. I looked at the patient and said that the tooth pulp was dead and urged that a skiagraph be made. He obtained a skiagraph, which showed that there was an abscess with destruction of all bone between the root of the tooth and antrum.

The pus was constantly passing from the dento-alveolar abscess into the antrum. His irrigations removed the pus in the antrum, but could not cure it. These are the conditions that prevailed, and I could relate case after case where the nasal wall has been punctured, the antrum has been flushed, and they have kept on flushing for months and months, and yet the pus has kept on flowing. You might as well undertake to purify a stream by going down a mountain half a mile from its source and undertake to purify it there; you will have to get to the origin of the pollution.

Our president has acquitted himself in a way that has been greatly to his credit and to the satisfaction of the society, as far as I am able to judge. All we have to do as a body is to work hard, not to become overenthusiastic, but analyze the propositions that are placed before the profession and endeavor to reach the truth. I remarked that the pendulum has already swung too far, and there are men who will be attributing every disease under the sun to the mouth that they do not understand. The mouth is going to be charged with all sorts of maladies, many of which are independent of it. Dentists are going to be charged with retaining teeth that should be extracted. It will be right in some instances to do that; they will be charged with crowning teeth and bridging teeth which, in the judgment of medical men should be removed. Sometimes the medical man is right; frequently he is wrong. As to what diseases call for the extraction of teeth, the educated dentist is the best judge.

DR. J. H. WOOLLEY:

I enjoyed the President's resume of the year's work, and I believe very much as Dr. Johnson has said in regard to the situation over in Europe, and as Dr. Brophy has remarked, I hope we will go to work and do our best for the coming year.

DR. TRUMAN W. BROPHY:

I want to add this to what I have already said, that the world will be dependent upon America more than any other country for professional advancement, because conditions in Europe are such that no professional advancement can be made until the war is over. So here in our own country, where we are living in peace, we will be able to do something at least toward carrying

on the work of the profession which the whole world would do if conditions were favorable.

DR. P. J. KESTER:

I simply want to voice my appreciation of the President's address which I think was one of the best addresses we have listened to.

His remarks on the war are an index to the interest he feels in this whole situation abroad. I think we all feel that. We all feel that big horror which is produced by conditions as they are. It seems impossible that war should be going on as it is, and yet it exists. Dr. Brophy has suggested that these disturbances will probably interfere with the advance of science. There is no question about that. The men who are in the position of scientists must necessarily let up in their investigations for the time being. They have practical things to do.

I have always had the theory that there are two ways of life, two roads to travel. One is up, and the other is down. I try to impress upon my children that the proper ideal is to turn their faces in the right direction, and go in that direction. As long as you are faced in the direction and are endeavoring to travel that way, you will finally more nearly approach the desired end. That applies to the study of science particularly. I think we, without taking any great credit to ourselves, may feel that every member of the Odontological Society has practically done his best; that he has endeavored to add his small mite to the grand sum of human knowledge, and it seems to me that there is nothing to do but to keep going in that direction, if possible.

Much has been said about the dangers of the pendulum swinging too far in the opposite direction, as Dr. Johnson and Dr. Brophy have said, but that is a natural result. There is not a man about this table or that has ever belonged to this society who has not emphasized all through his life the importance of the oral cavity in relation to disease. That has been one of the things uppermost in their minds throughout all the time I have known them. It is true, it was buried at times, it was obliterated somewhat, but yet at all times and at all seasons, there is not a gentleman here who has not expressed himself along the lines of the relation between the mouth and general disease.

I think probably the dentist has done more real work in the prevention of disease than has the medical man. He has constantly kept his mind on that one particular thing. The health of the patient depends very largely upon the condition of the oral cavity. We are all familiar with the extreme ignorance of the medical man of the past. He has displayed a very imperfect knowledge of both dental anatomy and dental pathology.

If Dr. Brophy would devote time to stimulating the interest and necessities for a thorough understanding of oral hygiene and oral pathology, he will have done a great work for humanity, because they do really need it.

I appreciate Dr. Davis's address very much, and I think he has carried out the ideas of the society in giving a resume of the year's work as well as other scientific work done by others during the year.

DR. DAVIS (closing):

There is very little I have to say in closing, because I have expressed myself very fully in what has been written. I might add a little experience which came to me within the last few days, in order to show the status of knowledge of the average medical man as compared with that of the dentist of the present time.

A gentleman whom you all know, one who has read papers before this society, had a patient a week or ten days ago go to him with a badly swollen face and tenderness over a molar in the upper jaw. I do not know which side it was, but after looking it over and applying the hot and cold tests, he decided the pulp was dead. He drilled in to remove the pulp from the three root canals. He found in the larger portion of the cavity that the pulp was gray and almost dead; that there was no sensation; that he opened in and got sensation and a bright pink color when he removed the pulp at the apical end. He applied a light dressing, sent the patient away, and told him he would receive comfort in very short order. But that evening he was called up and patient said the pain continued; that the pain was more intense and the swelling greater than it was in the morning. Patient said, "If you cannot do anything with this tooth, I am going to have it out." "All right," he said, "if that is the way you feel about it, we will take the tooth out if it continues to bother you." The patient came down in the

morning and the tooth was removed and a promise of comfort was elicited from the dentist. But that night the pain was more intense and the swelling was greater. No pus or abscess had shown itself in the meantime. The patient had called in the family physician out there. It was suggested that the patient be turned over to the physician and taken to the hospital for care and attention. Patient was a bachelor and lived in a rented room. He was taken to the hospital. The dentist heard nothing from the case for several days, but had occasion to go over to the hospital last Wednesday, a week ago tomorrow. The first person he met inside the hospital was the brother of the young man. He said to him: "You are just the man I want to see. We have a consultation on so and so's case" (meaning his brother's case). He said he was dying and remarked, "Can't you come up and do something?" The dentist said, "What have they done? What have they discovered?" He replied, "They think it is an infection of the glands." The dentist said, "Of course, I am only a dentist, and if you are having a consultation, I am not in it at all." However, he went to see the young man's brother and found him lying there with a swelling extending from the eye all down the arm, perfectly flat, so that the whole mass was one straight line from the shoulder to the eye, involving the entire face and neck. He immediately took a blood test, went downstairs into the bacteriological laboratory, and in fifteen minutes discovered fusiform bacilli and spirochetes in great number. In the meantime the doctors were in consultation and he was invited to come in and sit with them. He went in and they said, "What do you think about the case, doctor?" He replied, "What do you think about it?" Each one of them thought it was an infection of the glands on that side, but the dentist said, "What is the cause of the infection? Is it a pus infection? Have you found pus in great quantity?" No, they had not. He said, "What are you going to do?" Well, they were just deciding on what to do. "Well," he said, "gentlemen, I will tell you what I have found." He took a slide and put it under the microscope from the laboratory, and said, "If you are not satisfied, each one of you can make a slide for himself and decide upon the thing." This was a week ago Wednesday, and the dentist advised that an autogenous vaccine be made right away and given the patient. The patient was alive Thursday. A vaccine was being prepared that

evening and was going to be given the next day if the patient was alive.

There for a whole week that patient lay with five physicians seeing him, and they did not find out it was a fusiform infection along that side, and it took a dentist to tell them what was wrong. It only shows the spirit of the times is for the medical and the dental man to get together, and we have got to get together. The whole year has been on lines of such work as that, and I think, if for no other reason, the year 1914 will go down in history as one in which we have accomplished something for the benefit of humanity.



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EDITORIAL.

THE PANAMA-PACIFIC DENTAL CONGRESS.

It is none too early for the profession everywhere to begin preparations for the Panama-Pacific Dental Congress which convenes at San Francisco, August 30th to September 9th, 1915. The Committee of Organization has done much preliminary work and placed the meeting on a most substantial footing, and it remains for the profession in other sections of the country and in other countries to get to work on their part of the enterprise. The preparation of papers for such a meeting will take time and study, and the chairmen of the various sections should select their essayists at the earliest moment.

The situation in Europe and the fact that other American national dental organizations have decided to merge their interests largely with the Congress by going to San Francisco to hold their 1915 meetings, make this event one of unusual interest as the chief dental gathering during the year. It should be a matter of pride for every ethical American dentist to be there, and to this end plans should be made now to attend. The committee in selecting the place of meeting has set a new mark, so far as we are able to learn from all reports, for excellence of accommodations and attractiveness of surroundings. The meeting will be housed in a manner worthy the best that dentistry can provide, and we owe it to our confreres of California and the coast to turn out in large numbers, and all work with a will for the success of the meeting. As we said at the beginning, it is none too soon to begin.

MR. W. A. WILDE.

The DENTAL REVIEW announces, with sincere regret, the sudden death by heart disease of its business manager, Mr. W. A. Wilde, on Monday, January 4, 1915.

William Alfred Wilde was born at Bloomfield, N. J., January 29th, 1852; came to Chicago in 1872 and went with the firm of James Wilde, Jr. & Company, clothiers, where he remained till the



William Alfred Wilde.

firm went out of business in 1899. Since this date he has been connected with the DENTAL REVIEW. He was unmarried and made his home with his brother in Morgan Park where he spent his leisure time in the cultivation of flowers of which he was a great lover. The accompanying picture is typical of the man, seated as he is among the foliage, and in the midst of natural adornment. His crocuses were the first to bloom in the spring and he lingered longer than any over the last crimson flush of autumn. As a man he was steadfast as the hardiest perennial in his garden, and as constant as

the coming and going of the seasons. He was as reliable as the revolution of the planets, and as true as the best tempered steel

To the Editor of this journal his death comes as a severe shock. In all the years during which we had worked together in such close relationship there had developed a lasting friendship cemented by a conviction on the editor's part that in Mr. Wilde he had found a man of the highest type of honor and integrity and one who could be depended on to the last extremity. He always took an active interest in the welfare of the DENTAL REVIEW, and the editor owes much to him in the way of suggestions for improvement. It was his initiative which started the Practical Hints Department; and the long continuance of the vacation series of articles in the "Editor's Desk" was largely due to his keen interest and frank encouragement. He was the gentlest, kindest, and most sympathetic critic the editor had, and his gracious counsel will be sadly missed.

In all the realm of human kind there never was a man who meant better than he, nor one who came nearer to living up to the best he knew. To do a mean or underhanded thing was as foreign to his nature as to turn his back on the flowers which he loved so well. It is a pleasure to associate with such men as he, it is a loss when they are taken from us; and the recompense is only in remembering the good they did, and in trying to be worthy of the example they set.

To the relatives and friends of Mr. Wilde the Publisher and Editor of the DENTAL REVIEW extend their sincerest sympathy.



THE EDITOR'S DESK.

ABROAD IN WAR TIMES.

ANOTHER VACATION STORY.

(Continued from the January issue.)

PARIS AND THE WAR.

We had planned a trip to Fontainebleau, one of the most beautiful and historic spots in France, situated 37 miles from Paris, a

place made famous in French history as the abiding spot of Kings and Emperors. I was particularly desirous of visiting Fontainebleau and indulging my fancies over its historic and artistic traditions, but somehow the matter leaked out and two great nations conspired to keep me away. The moment it was found that I was going to Fontainebleau, Germany and France declared war. I had not the slightest idea that so much significance would be placed on a brief visit to Fontainebleau by an humble citizen of the United States, and I am free to confess that if I had known the consequences I should never have contemplated such a visit. In any event war prevented me from seeing Fontainebleau, and I wish to say something in particular about this same war later. Before doing so I must extend my impressions of Paris a trifle further, and make certain acknowledgments for courtesies shown me while there. First be it known that Paris has solved the problem of civic symmetry and beauty by refusing to have any sky-scrapers erected in her midst. I saw no buildings more than six stories high and I am informed that this is the limit. I have previously alluded to the artistic manner in which the streets are laid out, and they are further embellished by the presence of numerous trees. Paris is practically one large park, and its streets are animated and interesting day or night.

Most of her shopkeepers are dainty, neat, tidy and artistic; and in many cases important shops are tucked away on some side street or inner court in the most unobtrusive manner. No stranger need expect to shop to the best advantage in Paris, because many of the most desirable and reliable places are only to be found by one who knows the secrets of the city. When those places are discovered shopping is really a delight, because of the uniform courtesy and painstaking care with which one is served, and the quaint and basic honesty behind every transaction. I am aware that to make such a statement of Paris shopkeepers is to run counter to current opinion and I wish to be understood as alluding only to a certain class with which we were fortunate enough to come in contact. I had been told all sorts of stories about the chicanery of the Paris shopkeepers and of their propensity for fleecing American tourists, but I have nothing but the most delightful recollections of what little intercourse I had with them.

On the ship going over one of my friends said: "Do you shave yourself?" I replied that I did. "That's lucky," said he, and then

he related a former experience in Paris. He went to the barber to be shaved. The barber could not speak English and my friend could not speak French. After the shaving was done the barber pointed to my friend's face and in a pantomimic question asked if he wished something on it? My friend nodded—of course, he wanted talcum or some sort of powder on it. A fresh box of powder was opened and the face was made to feel very comfortable. The barber then pointed to his hair, and my friend nodded. He certainly wanted something on his hair. A new bottle of hair restorative was opened and some rubbed on. The barber next held up a hair brush enquiringly. Again my friend nodded—he surely wanted his hair brushed. A new brush was taken. When the operation was complete and my friend stepped out of the chair, the newly opened boxes, bottles and packages were wrapped up in a bundle and handed to him with a bill for more than \$5.00. He went to the hotel and waited for his wife, who had gone for a shampoo. She returned in a few minutes with a similar experience to relate except that her bill was slightly more than \$6.00, and her bundle a trifle larger.

We experienced no tendency to overcharge us or to impose on us in any way, though it is true that the average waiter or taxi-driver expects a little larger tip from Americans than from their own people. It is a pleasure to do this when one gets good service, and also in view of the fact that tips are not so high there as in America for the same service. I was taken to task by a Parisian for tipping a taxi-driver too much. He said: "You spoil those fellows by tipping too high, and then they become dissatisfied and insolent with us when we give them the usual tip. Now the next time we have a driver I will pay him, and I will make him tip his hat to me with five cents." Which he did. "There," said he, "That man is perfectly satisfied, and you would soon make him disagreeable with too large a tip." There is some truth in this, and as a matter of fact the entire tipping system is an abomination and a constant source of irritation. I could write a volume on this question and grow more emphatic in every line, but what would be the use? I surely could not reform the tipping system of Europe, and I refuse to make myself miserable in contemplation of it. But it is a subject upon which every one should be somewhat informed before making the first trip abroad, because it is one of the persistent and ever constant conditions which one must face at every

turn in traveling. At least one thing should never be forgotten—that every one expects a tip in Europe. As an illustration; at the hotel in Paris there were two elevators—"lifts" they are called—and we had used one of them for three or four trips. One morning my family came from their rooms with their wraps on to take a motor trip out in the country. The elevator boy jumped at the conclusion that they were leaving the hotel. As they stepped off the elevator he bowed low, and said: "All right, good by, thank you, much obliged." It was probably all the English he knew, but he worked it most vigorously for a tip—which of course he did not get. His countenance fell perceptibly, but visibly regained its composure that night as he saw us return to the hotel. If there was any one about the hotel who did not expect a tip except the clerk and the proprietor I failed to discover him, and after I got away and thought the matter over I was not altogether certain of these two. Tipping is the acute and chronic curse of traveling, but it must be accepted as the inevitable, and forgotten as soon as possible afterward.

One of the most striking things about Paris is her system of taxi-cabs. I never saw anything approaching it. Every one in Paris takes a taxi, and I have figured out the reason. In fact there are two—one because it is so cheap, and the other in self defence. A man might go to war and eventually come out alive, but he couldn't possibly walk the streets of Paris very long without being hit with a taxi. And if you are hit by a taxi or a cab, or by any moving vehicle in Paris you are arrested, while the driver of the vehicle is given a medal. I did not exactly see any of these medals, but I know they are given by the way the drivers act. Their chief aim in life seems to be to wing a pedestrian. They are always on the watch for people who cross the street on foot, and the moment they spy one they bear down on him with the throttle wide open, and an alertness that is amazing. If he dodges they dodge after him, and in order to escape them a pedestrian must be a pretty pert side-stepper. Several of them nearly grazed the sidewalk in their efforts to get me, and I am certain that if my accident insurance companies had known I was going to Paris they would have raised the rates on me.

And there is no speed limit. I watched those taxi-drivers in sheer admiration, and the way they shoot in and out among

other taxis, and cut corners and scamper up and down streets is a revelation. They are trained to the minute, and the millimeter. The sole ambition of the Paris taxi driver is to see how close he can come to it. If one of them misses another taxi or a cab by an inch it is the roughest and crudest kind of work. He is pronounced a "dub" in French, and is frowned upon with supreme contempt. He must invariably come within the thickness of a piece of tissue paper in order to be considered a decent driver, and the one who can always strike a spark of fire without taking off a wheel is regarded with distinction. I had always supposed that the French people were excitable and highly organized nervously, but if that is true they have imported a lot of foreigners for the taxi drivers of Paris. They are the "sangfroidest" lot of chaps I ever encountered, and to watch their countenances as they graze a vehicle or nip an eyelash off a pedestrian is to see the embodiment of nonchalance. I got so I would take a taxi just to see the fun. You soon find yourself entering into the spirit of the game, and you grow almost as gleeful as the driver himself when you see a pedestrian jump several feet sidewise. It is the greatest sport I ever indulged in, though of course a bit cruel, like bull-fighting, but in the excitement of the game you forget your finer sensibilities and conveniently revert back to barbarism—without a vestige of shame left in you. It is really exhilarating.

The streets of Paris are one continuous "Honk! Honk!" and it sounds as if the entire city had a perpetual cough. Taxis are everywhere, and in order to hail one all a person has to do is to step out on the walk and hold up the hand. If you do not happen to see one, never mind, hold up your hand just the same and a taxi will spring out of the earth. It is a great system. Strangely enough, in all that medley of machines I never saw a flat tire or a car stranded for any reason. They seemed to be proof against delay of any kind, and I could not help conjecturing as to the possibility of them using a different kind of air for their tires than we do at home. My hat off to the taxi system of Paris—my hat off many times.

THE BANQUET.

On the evening of July 25, I was tendered a banquet at the Cafe de la Paix. The nature of it came to me as a great surprise. I had supposed that half a dozen of my own boys from the Chicago

College of Dental Surgery were to meet me at dinner and that we were to have a quiet evening together, but to my astonishment, and even my embarrassment, I found about fifty of the leading practitioners of Europe, interspersed with a few of my American friends, around the board to do me honor. I have seldom been so profoundly affected. This was my first visit to Paris—a fact which I have previously acknowledged with a suitable measure of shame—and to receive at the hands of my fellow practitioners such a testimonial as this was beyond anything my poor imagination could ever have conjectured. There were present some of my good old friends of many years; there were those whom I had known by reputation but had never met, and there were some whose names I had never heard till that evening; but they were all so cordial, and so gracious, that before the evening was over I felt as if I must somehow have had their acquaintance all my life. Speeches were made which I blush to recall, and even yet I am amazed to think how very greatly a big-hearted body of men can overestimate their guest. If I could have felt that I merited one-half the things they said I surely would have sat more comfortably in my seat. But now that it is long since past I look back upon it as a sweet savor of the graciousness and magnanimity of my fellow practitioners abroad and at home, and I shall never forget that most delightful evening. The tables were decorated with the tri-color of France and the Stars and Stripes, and the association of those two flags led me to acknowledge the lasting indebtedness which the United States owed to France both as regards the profession of dentistry and as a nation. It was the immortal Fauchard who gave to dentistry a status in the early days of its real struggle for existence, and it was the equally immortal Lafayette who came over from France to the aid of Washington in those dark days when the Republic was striving so hard for its life.

Some of the speeches were made in French, while others were made by Frenchmen in English, a fact which made it difficult for me to forgive myself for not having learned French long ago. When I see those splendid men with several languages at their command, I am embarrassed beyond measure to think I speak only one and have so very much trouble even with that.

I must not dismiss this banquet without a word of thanks to the promoters and a brief reference to what the young people at

home would call "the eats." The cooking of France is proverbial, and I am a witness to the fact that the cafes of Paris excel in this respect. It is astonishing how very many places one may visit there and get the most delicious viands served in the most appetizing way. The dinner that night at the Cafe de la Paix—well, I wish I might have the pleasure of serving such a dinner to my friends some fine evening in Chicago. The Parisians know to a nicety how to get up a meal, and when you partake of one of their most elaborate dinners you are never troubled with indigestion. The art of cooking is a fine art, and the Parisians have mastered it to a higher degree than any other people with whom I am familiar.

That night after the banquet, as we were chatting in an upper room of the cafe, one of my friends said to me: "Doctor, it would be difficult for you to understand the temperament of the people of Paris—I mean the people on the streets. Looking down at them as we do now, passing back and forth along the streets, one could never imagine that anything would ever disturb them or interfere with the happy-go-lucky air they exhibit; and yet in twenty-four hours they may be cutting each other's throats." And in less than one short week how fully his words came true. At that moment I had heard no hint of war, and in fact days after, when murmurs began to hum, I still said that a general war was impossible in this enlightened age. But the men of France shook their heads, and they knew better than I.

It had been my plan to make a call on each of the distinguished men of Paris who had honored me by attending the banquet, and to express to them in person my keen appreciation, but in the twinkling of an eye I was "catapulted" out of Paris and out of France by the grim declaration of war. And this is how it came about: During the week following the banquet the meetings of the European Orthodontia Society and the American Dental Society of Europe were being held, and everything was apparently moving as merrily as the proverbial marriage bell. Then came that last exciting twenty-four hours culminating on Friday night in the banquet of the American Dental Society of Europe. During the banquet while speeches were made as usual there was an undercurrent of suspense which every one felt. Fortunately the banquet hall in the Hotel Continental was an inside room where the noises of the street could not penetrate, because outside the mobs were marching and the excitement of the

populace was rising. It fell to my lot to make a speech at the banquet, and after I had concluded a friend of mine who lives in Paris tapped me on the shoulder and told me that he wished to speak to me immediately after the banquet. As we arose from the table he rushed to me excitedly and said: "My dear Doctor, you are here with your wife and daughters, and you must get out of Paris at once. I know what this thing means, and you do not. I wish it had been possible for you to get the midnight train for London, but it is too late for that. Let me implore you to go on the earliest train in the morning."

The description of our last hours in Paris and of the Paris mobs must be left for another chapter.

C. N. J.

(*To be continued.*)

PRACTICAL HINTS.

Edited by J. E. Schaefer, D. D. S.

(This department is for busy readers. We want short articles containing practical hints—the shorter the better. No article must exceed 200 words, unless of exceptional merit. Every dentist has some useful hint that has been of value to him, and if he will only put it in print it may be of equal value to others. That is what this department is for. Due credit will be given for every article sent. Address J. E. Schaefer, 1745 W. Harrison St., Chicago, Ill.)

Selecting Bicuspid and Molars:—In selecting upper bicuspid and molars be sure they have the short lingual cusps of nature, and pins low down.—*L. P. Haskell, Chicago, Ill.*

Vaseline Stoppers of Medicine Bottles:—The glass stoppers of medicine bottles may be prevented from sticking by the application of a thin coat of vaseline to each stopper.—*C. A. Halle, D. D. S., Chicago, Ill.*

An Aid in Upper Root Canal Work:—It is quite possible to introduce high fusing paraffine or rosin and chloroform into upper teeth by tipping the operating chair and then dropping the head rest.—*E. S. Best, D. D. S., Minneapolis, Minn.*

Plate Retention:—The theory of the retention of upper den-

tures, especially in flat jaws, is not suction, but adhesion. The plate coming in close contact with the moist membrane and not permitted to rest on the hard center by use of a "relief," causes it to be retained.—*L. P. Haskell, D. D. S., Chicago, Ill.*

Investing a Cast Cusp Crown:—In casting the cusps of a gold crown the sprue can be inserted from the inside of the band to the under cusp surface of the wax. By inserting it here, when cast, the cusps will be free from a sprue mark and can be easily polished. A bur will cut off the sprue. In long crowns, with this method of attaching the sprue, the band will not be as near the bottom of the casting ring.—*F. S. Dilger, D. D. S., Chicago, Ill.*

Casting Cusps for Banded Crown:—In constructing banded crown with cast cusps good results can sometimes be obtained by fitting band and placing it in position on root and then placing wax in position obtaining bite and removing wax pattern and treating it like an inlay, casting and afterwards soldering or sweating it into position in the band. The chief advantages are that the wax pattern is not distorted as is often the case in removing it "in situ" in a closely fitting band, also the thickness of gold in cusps can be more readily adjusted and the union between band and cusps assured.—*A. G. Salisbury, Takaka, New Zealand.*

Novocain and Suprarenal Extract:—The addition of suprarenal extract to the novocain solution. Klapp, Braun, and others have shown that suprarenal extract greatly retards its absorption, enhances the anesthetic by prolonging its action and, as it intensifies the anesthesia, much weaker solutions can be used; furthermore, it produces a more or less bloodless field.

Too much suprarenal extract, however, should not be used, as symptoms such as feelings of oppression, palpitation, and increase in pulse rate, rapid and deep breathing may be caused by it. These, however, are evanescent and not serious, as its injection beneath the skin does not raise blood-pressure as it does when it is injected into a vein, and follows the injection of $\frac{1}{2}$ cc. or more.—*Herbert A. Potts, D. D. S., M. D., Chicago, Ill.*

The Sterilization of Instruments:—One is safe in sterilizing instruments by boiling them, but there are some drawbacks to this method which hinder its application. One is rusting and thereby marring the appearance of the instruments.

A very efficacious method I use in my office for my forceps, and it can be used for all other instruments, is one pint of tincture of green soap with four grains of bichlorid of mercury.

Procure a large glass jar, Mason or glass covered one, with sufficient depth that the instruments can stand on end without interfering with cover. Put quantity of water in to cover two inches or more of the instruments and add to this one ounce of the solution.

This will not tarnish the instruments however long they remain in it.—*Dudley Dean Bayless, Chicago.*

Proportions of Alloy and Mercury:—The proportions of alloy and mercury necessary to make a proper mix of amalgam vary in different alloys. Such proportions are usually found in the printed directions accompanying the alloy and should be rigidly followed, unless the experience of the operator has necessitated a slight change.

That these proportions be correct is quite imperative, for an insufficient amount of mercury results in an incomplete mix, due to lack of free mercury which the alloy needs. But on the contrary, if an excess of mercury be used, the filings glide around or float in the mercury, which inhibits its being properly rubbed into the alloy by moderate friction as it should be. It is the opinion of the highest authorities, as well as the experience of the profession at large, that the use of a slight excess of mercury facilitates amalgamation and is in no way injurious, provided such excess be removed before the completion of the filling.—*Wm. E. Harper, D. D. S., Chicago, Ill.*

The Qualities of a Good Gold Filling:—In the first place, the making of a gold foil filling is a very difficult operation. By a good filling I mean one that has all of the qualities of a filling necessary to permanently save the tooth, that is, it must have the property of impermeability, the gold must be so thoroughly condensed that it will to the greatest possible extent eliminate air spaces so that there will not be a spongy mass of gold in the tooth to act as an absorbent of the fluids of the mouth, rather than a hygienic metal plug perfectly filling the cavity in the tooth. Only those that have made a

study of fillings that have failed have any conception of the number of gold fillings that are inserted that fail to be condensed sufficiently to make an impermeable mass. If you have any doubts in the matter take the fillings that you remove from teeth and hold them over an alcohol lamp and see if they do not blacken and burn out the carboniferous material that has been absorbed during its life as a filling. —J. V. Conzett, D. D. S., Dubuque, Ia.

OBITUARY.

DR. GEORGE BERTRAM FIFIELD MONK.

Dr. Monk was the son of Dr. Charles J. Monk, a distinguished member of the American Dental Society of Europe, who practiced in Wiesbaden, Germany, till the outbreak of the war, when he went back to his native home in England. Dr. Bertram Monk was graduated from the Dental Department of the University of Michigan in 1913, and immediately left for London, where he entered Guy's Hospital Medical School for the purpose of completing his medical course. While there he joined the Militia Company and was among the first to volunteer in the present war. Five weeks before his death he was promoted to be a Lieutenant in the Royal Warwickshire Regiment, and was killed in action December 18, 1914.

This may be chronicled as only an incident of the great war, and yet the death of this young man is peculiarly sad in view of his great promise, and the large number of friends he had made for himself in America and Europe. He was a diligent student in college and made a splendid record. His death is not only a distinct loss to dentistry, but a severe bereavement to his father on whom the exigencies of the present war have fallen with unusual hardship. We extend to the family of this brave boy our sincerest sympathy.

MEMORANDA.

[Society notices will be given insertion in this department free of charge. Subsequent insertions will be charged for at the rate of \$2.00 an inch.]

THE SOUTHERN MINNESOTA DISTRICT DENTAL SOCIETY

Will hold its annual meeting April 12th, 13th and 14th at Mankato, Minn. A literary and clinical program will be carried out. G. W. Norris, Secretary.

DEATH OF DR. W. J. M'INTYRE.

Dr. McIntyre died of tuberculosis at the Woodman Sanitarium, Woodman, Colorado. He was a graduate of the class of 1908 Chicago College of Dental Surgery, and was in successful practice in Oak Park, Ill., from the time of his graduation till a short time before his death, when ill-health compelled him to retire. He leaves a wife and family, and a large circle of loyal friends, to whom his death will come as a heavy blow.

ALUMNI ASSOCIATION OF THE UNIVERSITY OF BUFFALO, DENTAL DEPARTMENT.

The fifteenth annual meeting of the Alumni Association, Dental Department of the University of Buffalo, will be held Friday and Saturday, February 5 and 6, 1915, at the Hotel Iroquois, Buffalo, N. Y. Dr. C. N. Johnson of Chicago will read a paper entitled "Certain Phases of Pulp Canal Treatment."

Men of international reputation have been secured to talk and give practical demonstrations on the subjects requested by the members of the alumni, namely, Pyorrhea, Anesthesia, Analgesia, Attachments for Movable Bridge Work, Anatomical Occlusion, Porcelain and Gold Inlays, and Radiography.

Friday evening an informal dinner will be given in honor of our guests, and the classes of 1895 and 1905 will hold their twentieth and tenth anniversaries.

The exhibitors' display will surpass that of any previous year and the room will be open during the entire meeting. All ethical dentists are cordially invited. D. H. McCoy, President; E. J. Farmer, Secretary.

RESOLUTIONS PASSED BY THE CLEVELAND CITY DENTAL SOCIETY.

Whereas, our Heavenly Father in his Divine wisdom has seen fit to remove from the sphere of his earthly labors our esteemed friend and brother, Dr. Charles Richard Butler; therefore be it

Resolved, That this society deeply mourns the loss of one of its most cherished charter members, one who ever displayed a kindness of nature and generosity of heart which will always be remembered with the warmest affection.

Resolved, That this society extends its heartfelt sympathy to his bereaved widow, relatives and friends.

Resolved, That these resolutions be spread on the minutes of this society and published in the dental journals, and a copy be forwarded to his widow, Mrs. Jane Eddy Butler, 1685 Van Buren street, St. Paul, Minn.

H. L. AMBLER,
S. B. DEWEY,
H. F. HARVEY,
J. F. STEPHAN,
W. H. WHITSLAR,
F. M. CASTO,

Committee.

THE INTERNATIONAL JOURNAL OF ORTHODONTIA.

This is a new dental journal, the first issue of which is just out. It is published by the C. V. Mosby Company of St. Louis, Mo., and edited by Dr. Martin Dewey of Kansas City, Mo. This is sufficient to insure for it a cordial reception on the part of the profession, because both publisher and editor are well and favorably known everywhere. The first number gives promise of being a splendid addition to our periodical literature, particularly, of course, that part concerned with the growing science of orthodontia. This is the first journal, so far as we are aware, devoted to the specialty of orthodontia, and we predict for it

a wide field of usefulness. To the publisher and editor we extend our congratulations on the initial issue, and our best wishes for the continued success of the journal.

THE OKLAHOMA STATE DENTAL SOCIETY.

The next meeting of this society will be held in Oklahoma City, March 15, 16, 17, 18, 19, 1915. The meeting will be conducted somewhat along the same lines (the post-graduate plan) that have proven so valuable in this state the past few years. The principal lecturers will be Drs. J. H. Prothero and W. H. G. Logan of Chicago. Dr. Prothero's lectures will be confined to important phases of Prosthetic Dentistry, while Dr. Logan will give lectures on modern methods of treating Pyorrhea, and on local anesthesia. Reputable dentists from out of the state are welcome to this meeting, but are required to pay a fee of five dollars for the lectures and clinics. C. R. Lawrence, Secretary, Enid, Okla.

RECENT PATENTS OF INTEREST TO DENTISTS.

- 1,092,553. Producing dental suction, James H. Abbott, Philadelphia, Pa.
- 1,092,554. Suction for dental plates, James H. Abbott, Philadelphia, Pa.
- 1,092,701. Dental instrument, George S. Edwards, Greencastle, Pa.
- 1,092,671. Dental jaw-brace, Mathieu Souvielle, Jacksonville, Fla.
- 1,092,307. Dental instrument, John L. Talbott and W. S. Wright, Lompoc, Cal.
- 1,093,125. Impression device for dental use, W. C. J. Guilford, Washington, D. C.
- 1,093,420. Blowpipe, Charles Holder, Jr., New York, N. Y.
- 1,093,495. Blowpipe, Matthew Steel, Sr., and M. Steel, Jr., Gosforth, England.
- 1,094,203. Dental impression tray and detachable handle, Leslie E. Eaton, Sturgis, S. D.
- 1,093,865. Sanitary shield for dental instruments, Chapin F. Lauderdale, Portland, Oregon.
- 1,094,257. Evacuator, Adolph W. Schramm, Riverton, N. J., and P. Russell, Brooklyn, N. Y.
- 1,094,269. Dental crown remover, Richardson H. Taylor, Meeker, Colo.
- 1,095,018. Artificial teeth, Glenn E and J. G. Morningstar, Greenville, Ohio.
- 1,094,746. Artificial denture, Adolf Pochwadt, Berlin-Schoneberg, Germany.
- 1,094,818. Manually-operated rotary dental tool, Orin C. Samphere, Milwaukee, Wis.
- 1,095,449. Dental tool, King Brooks and W. V. Owen, Paducah, Ky.
- 1,095,356. Sprue cutter, Frank X. Riel and F. W. Williston, Rochester, N. Y.
- 1,095,948. Adjustable matrix for teeth-fillings, Thomas D. Thurmond, Forsyth, Ga.
- 1,096,095. Blowpipe apparatus, Worthly C. Bucknam, Jersey City, N. J.
- 1,096,712. Skeleton crown and facing therefor, Ernest F. Greer, Idabel, Okla.
- 1,096,447. Device for manufacturing dental backings, Adam N. Moeller, Elyria, Ohio.
- 1,096,195. Dental articulator, Dixie Roberts, Arkansas City, Kans.
- 1,097,520. Matrix device for use in stopping or filling teeth or for similar purposes, Frederick J. Bonnalie, Chester, England.
- 1,096,943. Blowpipe, Carl H. Peake, Detroit, Mich.
- 1,097,263. Blowpipe, William I. Reich, New York, N. Y.
- 1,097,264. Blowpipe, William I. Reich, New York, N. Y.
- 1,098,008. Tooth-paste dispensing device, Ernest A. Ash, New York, N. Y.
- 1,098,251. Skeleton crown holder, Ernest F. Greer, Idabel, Okla.
- 1,098,331. Artificial denture, Carl Rauhe, Dusseldorf, Germany.
- 45,842. Design, dental molding flask, Theodore G. Lewis, Buffalo, N. Y.

Copies of above patents may be obtained for fifteen cents each by addressing John A. Saul, Solicitor of Patents, Fendall Building, Washington, D. C.

THE CANADIAN DENTAL RESEARCH PRIZES.

Dear Doctor: At the last meeting of the Canadian Dental Association, held in Winnipeg, the sum of \$1,000.00 was donated to the Canadian Dental Association by the Canadian Oral Prophylactic Association, to be offered as prizes to the profession in Canada for dental research work; also in addition a further sum, not to exceed \$250.00, was guaranteed for the purchase of suitably inscribed medals for the prize winners and to cover the expenses of judges, etc.

The above sum of \$1,000.00 has been deposited in the bank in the names of Dr. W. F. Barbour, President of the Canadian Dental Association, and Dr. A. J. McDonagh, President of the Canadian Oral Prophylactic Association, as trustees.

The conditions of this competition are as follows: Three prizes are offered for the best contributions to dental science—first, \$500.00; second, \$300.00; third, \$200.00. The competitors must have their contributions in the hands of the trustee of documents, Dr. W. E. Willmott, 96 College street, Toronto, three months before the next meeting of the Canadian Dental Association, which will be held during the year 1916, exact date of which will be announced later.

The competition is open to any legally qualified dentist in Canada, and the prizes are to be known as the "Canadian Dental Research Prizes."

The Executive of the Canadian Dental Association shall have the right, if they so desire, to have the prize essays or contributions presented as a part of the program of the 1916 meeting.

Any prize contributions not accepted for presentation at the 1916 meeting of the Canadian Dental Association shall be the property of the Canadian Oral Prophylactic Association for publication.

(The two foregoing clauses shall not prevent any competitor from securing his rights upon any patentable instrument, device or process.)

All other than prize contributions presented to the judges may, with the consent of the authors, be published by the Canadian Oral Prophylactic Association.

Three judges will be chosen by the Executive of the Canadian Dental Association from faculties of Dental Colleges not in Canada, who will use their discretion in awarding the whole or part or none of the prizes, in accordance with the value of the contributions.

The Canadian Oral Prophylactic Association, in making this munificent offer to the Canadian Dental Association, had in mind the fact that there are many men in our profession eminently qualified to do research work, but are unable to devote the necessary amount of time to it for lack of funds, and it is their desire, in the interests of dentistry, to assist in a financial way those who show ability along this line.

Your committee, realizing the fact that the science of dentistry has not yet reached its zenith, hopes that through this competition a stimulus may be given to the profession in Canada so that something worth while may be added to our knowledge.

It may be found expedient in the near future to establish a permanent experimental laboratory and staff, or help in the maintenance of one, which would give to the profession in Canada not only the result of its research work, but also act as a reference bureau for any of its members who might desire information along any special line. If some such result should grow out of this competition, the Canadian Oral Prophylactic Association will no doubt devote a part of its ever-increasing fund toward this end.

The Secretary will be pleased to receive communications from any members of the profession in reference to this competition and will gladly supply any information required. Horace E. Eaton, Chairman; George W. Grieve, Secretary.

PANAMA-PACIFIC DENTAL CONGRESS. TRANSPORTATION INFORMATION.

Following the usual custom and in order that all those who desire to attend the Panama-Pacific Dental Congress at San Francisco, August 30th to September 9th, 1915, may do so with the maximum of comfort and pleasure and minimum of fatigue and inconvenience, the Transportation Committees announce that arrangements have been made for special train service. The present plan is to have three special trains from Chicago, leaving as follows:

First Train—Leave Chicago on August 21st, going via Kansas City and the Santa Fe. Stop-overs will be made at Colorado Springs, Isleta Indian Village, the Grand Canyon, Redlands, Riverside, San Diego and Los Angeles.

Second Train—Leave Chicago on August 24th, going via Denver, the D. & R. G. and Western Pacific. Train 2 includes stop-overs of one day in Colorado Springs and special attention has been given to the schedule so that our party will pass through the scenic points of interest in daylight.

Third Train—Leave Chicago on August 25th, going via Denver, the D. & R. G. and Western Pacific, as in Route 2. It will be noted that the two trains, that is, the trains leaving Chicago on the 24th and 25th, will meet in Colorado Springs and proceed from there in one or two trains, according to the number who will take this route. It will also be noted that all the trains have been arranged so as to arrive in San Francisco one day prior to the opening of our convention.

There is a possibility that the number from the East will be sufficiently large to warrant the running of a special train right through from New York, in which case the Eastern and Chicago and in-vicinity parties will be consolidated and go as one train from Chicago. In the event that there is not a sufficient number to warrant the running of a special train from New York, special through sleepers will be provided and will run through from New York to San Francisco on all of the three schedules outlined.

For the advance information of those interested in the trip, the Transportation Committees have endeavored to show briefly what the schedules of the trains will be. A circular outlining the trip in detail will be prepared some time in the near future and will be distributed generally to members of the association.

Train Schedule I.

Leave New York 5 p. m. August 20th, via New York Central Wolverine; arrive Albany 8:15 p. m. (Connect with trains from Boston and other points in New England States.)

Leave Boston 2:00 p. m. August 20th; arrive Albany 7:45 p. m.; arrive Schenectady 8:47 p. m. (via New York Central Wolverine); arrive Utica 10:23 p. m.; arrive Syracuse 11:40 p. m.; arrive Rochester 1:20 a. m. August 21st; arrive Buffalo 3:10 a. m. (Eastern time); arrive Detroit 7:10 a. m. (Central time); arrive Ann Arbor 8:12 a. m.; arrive Chicago Central Station 2:00 p. m.

Leave Chicago 6:10 p. m. August 21st, via Chicago, Burlington & Quincy; arrive Kansas City 8:00 a. m. August 22nd.

Leave Kansas City 11:00 a. m. August 22nd, via Atchison, Topeka & Santa Fe; arrive Colorado Springs 6:30 a. m. August 23rd.

Leave Colorado Springs 8:30 p. m. August 23rd; arrive Albuquerque 1:20 p. m. August 24th.

Leave Albuquerque 2:00 p. m. August 24th; arrive Isleta 2:30 p. m. August 24th.

Leave Isleta 4:00 p. m. August 24th; arrive Grand Canyon 5:00 a. m. August 25th.

Leave Grand Canyon 8:00 p. m. August 25th; arrive Redlands 12:30 p. m. August 26th.

Leave Redlands 2:30 p. m. August 26th; arrive Riverside 3:30 p. m. August 26th.

Leave Riverside 11:59 p. m. August 26th; arrive San Diego 7:00 a. m. August 27th.

Leave San Diego 11:59 p. m. August 27th; arrive Los Angeles 7:00 a. m. August 28th.

Leave Los Angeles 8:00 p. m. August 28th, via Southern Pacific; arrive San Francisco 9:45 a. m. August 29th.

Railway fare from New York to San Francisco via the above route and returning via any direct route.....\$98.80

The Wolverine Fast Express, New York to Chicago, extra charge..... 6.00

Railway fare from Chicago to San Francisco going via the above route and returning via any direct route..... 62.50

Lower berth from New York to Chicago..... 5.00

Lower berth, Chicago to San Diego (estimated)..... 18.50

Lower berth, San Diego to Los Angeles..... 1.50

Lower berth, Los Angeles to San Francisco..... 2.50

Side trip from Williams to Grand Canyon and return..... 7.50

There are many passenger trains from New York to Chicago. The faster trains are more expensive. The fair on the slower trains is less. Either can be utilized in making connection with the following schedules:

Train Schedule II.

Leave Chicago 11:00 p. m. August 24th, via C. B. & Q.; arrive Denver 7:00 a. m. August 26th.

Leave Denver 8:00 a. m. August 26th, via D. & R. G.; arrive Colorado Springs 10:30 a. m. August 26th.

Leave Colorado Springs 10:30 a. m. August 27th; arrive Salt Lake City 12:30 p. m. August 28th.

Leave Salt Lake City 1:00 p. m. August 28th, via Western Pacific; arrive San Francisco 5:00 p. m. August 29th.

Railroad fare from Chicago to San Francisco going via the above route and returning via any direct route..... 62.50

Returning via Portland, Ore..... 80.00

Lower berth, Chicago to San Francisco (estimated)..... 15.00

Train Schedule III.

Leave Chicago 11:00 p. m. August 25th, via C. B. & Q.; arrive Denver 7:00 a. m. August 27th.

Leave Denver 8:00 a. m. August 27th, via D. & R. G.

Leave Colorado Springs 10:30 a. m. August 27th; arrive Salt Lake City 12:30 p. m. August 28th.

Leave Salt Lake City 1:00 p. m. August 28th, via Western Pacific; arrive San Francisco 5:00 p. m. August 29th.

Rates will be the same as Route 2, except that a standard lower berth from Chicago to San Francisco will be \$13.00.

By the Northern routes to San Francisco and return by a Central or Southern route, there is an added fee of \$17.20.

Transportation Committee National Dental Association:

Dr. Victor H. Jackson, Chairman.

Dr. H. F. Hoffman,

Dr. Jos. D. Eby,

Dr. D. C. Bacon,

Dr. Henry W. Weirick,

Dr. J. P. Marshall.

Transportation Committee Panama-Pacific Dental Congress:

Dr. Henry W. Weirick, Chairman.

Dr. Harry P. Evans,

Dr. Alpheus R. Brown,

Dr. E. M. Carson,

Dr. F. W. Gethro,

Dr. Jos. D. Eby.

THE DENTAL REVIEW.

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No. 3

THE GOSPEL OF EFFICIENCY.*

BY C. EDMUND KELLS, D. D. S., NEW ORLEANS, LA.

To be invited to appear before the St. Louis Dental Society—nearly a thousand miles away—was certainly a very great honor, and likewise as much of a pleasure, though the latter was not entirely unalloyed, through the fear sometimes creeping in, that the selection of the subject might not prove a happy one.

Efficiency, however, is the "last cry" in the business world. Owing to keen competition, a small percentage one way or the other, may throw the yearly balance upon the credit or debit side of the ledger.

Bright minds have created the science of teaching others how to eliminate waste of time. Large fees are earned by these specialists who, by simply reorganizing the methods in vogue, cut out unnecessary waste of time, and thus an unproductive factory is magically transformed into a paying investment.

One needs to travel but little to observe the inefficiency of, the enormous waste of time by, the ordinary dental practitioner, however capable he may otherwise be, and thus there is a vast field in the practice of dentistry for the spread of the gospel of efficiency.

In this belief lies the reason for the selection of the subject of the evening. If it is not of interest to my hearers, they must take it out upon their president, for his invitation to be with you this evening was accepted only upon his assurance that the subject would strike a popular chord. But if, timely as is the subject, the methods here suggested to the busy dentist for "splitting seconds" and improving the quality of his

* Read before the St. Louis Dental Society.

work do not appear assimilable, then, pray, be lenient, for the writer has done the best he could.

HENRY FORD.

There is a party who lives up in Detroit of the name of Ford. Possibly you may have heard of him. He builds automobiles.

Not only does he build automobiles but he completes, turns out and sells for cash one car every thirty seconds. In other words, while I have been standing before you Mr. Ford has built and sold about four cars. Incredible as this does appear, it is nevertheless true, and the very best of it all is that Mr. Ford himself has not even seen the cars we are talking about.

These Ford results are obtained solely through the agency of efficiency—based upon:

1. The use of the highest type of labor-saving machinery.
2. The exhibition of the highest class of *Team Work*.

The Ford factories certainly crowd the "Gospel of Efficiency" to the limit.

Just as these principles of Efficiency have carried Mr. Ford to the front rank of automobile manufacturers, so may the same principles applied to his practice place a dentist in the van of his profession.

TELEPHONE EXCHANGE.

Inquire of the business world and you will be told that the telephone industry presents an anomaly, for contrary to usual practice the more its business increases the more it costs per capita to transact it.

Whether or not this is true I am unable to say, but if it is the telephone exchange is not unique in this particular, for as a dental practice grows, the loss of time and consequently the cost of running the office increases at a rate out of all proportion to its growth.

A single example only will suffice to establish this fact. When in a small practice one sees say six people per day, the hands are washed a minimum of twelve times, the time so spent being inappreciable. But when the practice has grown to say thirty people per day, that means the washing of the hands at least sixty times, and the time now consumed in that manner is a very appreciable part of the working day.

In a small practice the interruptions are few, while in a large one they must necessarily be many, thus time becomes the most important factor with which the busy dentist has to deal today.

Such being the case, each who has become a restless, insubordinate subject to this factor must look in every direction for hints of various kinds—taking this from one, that from another, and so on down the line—ever discarding that which can be improved upon, and always on the alert for anything which will help him in his everlasting struggle against this tyrant, "Time."

When I said these would be suggestions to the busy dentist for the "splitting of seconds" and *improving the quality of his work*, I used the words advisedly, for there comes a time to every successful young man when it becomes difficult to keep pace with the work presenting, and then he must choose between saving time by slighting his work or making time by adopting improved methods and time saving appliances.

The first choice leads to failure sooner or later, while by improving one's methods and gradually systematizing everything down to the very limit, not only can one's output be vastly increased, but at the same time one's ideals can be raised, and thus permanent success become assured.

There is an old adage which reads: "Take care of the pennies and the pounds will take care of themselves."

A new one is suggested: Take care of the seconds and the hours will take care of themselves.

HASTE.

And right here a word upon Haste may not be inopportune. Of all things that are out of place in a dental office, Haste about heads the list. Rapidity of accomplishment must be acquired by rapid motions, but *deliberate action*.

The absolute elimination of all waste of time by well planned methods and Efficiency accomplishes the required speed without the necessity for any haste. To have an operation apparently hurried would prove undesirable to the average patient, as such would undoubtedly suggest poor results.

The operator must never say, even to a suffering patient, "I will hurry," rather should he say, "We will lose no time," for by

losing no time, he actually hurries, though deliberately. Apparently contrasting statements, but actually not so.

With plenty of assistance at hand, time saving devices and systematic methods in constant use, there need be no occasion for hurry in the actual operations themselves, and therefore no necessity for slighting the veriest details.

The very best results can only be obtained where the right instrument is always at hand for every step of the work. It is never mislaid nor any time ever spent looking for it. Here is where the possibility of splitting seconds puts Efficiency on the map.

It is not our purpose to occupy your time describing office systems based upon the classification of instruments by their handles and the keeping of such in separate drawers. Nor the advantages of having each instrument numbered and separately located, the necessity for and duties of a young lady assistant, etc., with all of which you are familiar and which should enter into any kindergarten dental office system.

The object is to bring to your notice only such devices and methods as are original, and therefore unfamiliar, and only such as have been created in the strife against time and struggle for Efficiency, and which have been thoroughly tested out and proven their value.

None are so bold as to dispute the fact that nearly all dental operations are both arduous and difficult and therefore any appliances, devices or methods which render the accomplishment of these operations a little less arduous or difficult, must make for better results and it is after these elusive better results that we are continually speeding.

OFFICE SYSTEM.

An office system might well be likened unto a chain, each link of which represents some necessary detail, and this whole chain of Efficiency can be rated no higher than that of the weakest link.

BASIS OF EFFICIENCY.

The basis of Efficiency must necessarily be a suite of offices sufficient to meet the individual requirements of the operator, whatever they may be, and a staff of assistants who will relieve him of every possible detail, however few or many they need be.

As he stands or sits at his operating chair, he should be able to reach with ease, and instantly select any single instrument or

appliance used in ordinary routine work, and his trained assistant always at his side and upon the alert.

Just as the "output" of the ordinary brick layer was marvelously increased by the elimination of many of his unnecessary motions, so can the output of the dentist be increased by the proper facilities for cutting out all of his unnecessary motions.

ANNEX

To maintain two duplicate operating rooms complete in all their details is a practical impossibility and not really necessary, therefore the second operating room or Annex needs only to be equipped with an engine, compressed air and such instruments as are necessary for examination, treatments, polishing fillings and like.

If one includes extracting in his work and gives anesthetics, a third operating room should be especially equipped for such service.

TIME SAVING DEVICES.

The three great time saving mechanical appliances which are at our command are:

1. Electric Engine.
2. Saliva Ejector.
3. Compressed Air.

And they rank (to me) in usefulness in the order in which they appear.

THE ELECTRIC ENGINE.

While the electric engine takes first rank as a time saver, it is by no means infallible and therefore its Efficiency may be greatly impaired unless preparation has been made to reduce the loss of time caused by its going out of commission while in use.

A duplicate pulley head and arm complete can always be at hand to replace a broken cable, or duplex spring, with practically no loss of time, but when the footpiece or electric cable gets out of order, one is up against a stronger proposition.

To overcome this difficulty and also for other reasons, the writer uses special foot controllers of his own design and they and the motors are connected up by the ordinary electric lamp plug connectors, so that the controllers of the engines in the two offices are immediately interchangeable. A third complete controller is kept in reserve ready for plugging in.

Under this system no appreciable delay is caused, when in the

course of time something does happen. However, if the motor should fail, something that is most rare, the only alternative is to take the patient into the Annex and complete the work there.

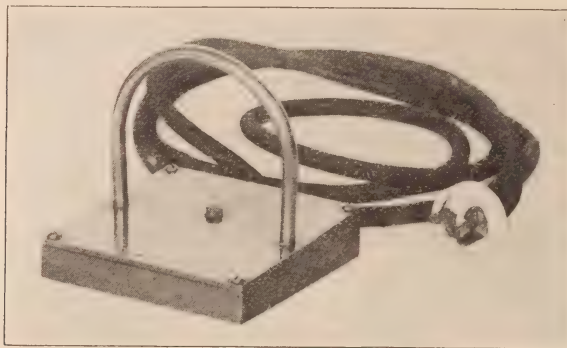


Fig. 1. Controller and Connecting Plug.

BUR RACK.

Given an operator who uses say only twenty different kinds and sizes of burs, and a bur rack with a capacity of one hundred and fifty instruments, it is the exception I believe to find less than one hundred and fifty instruments in the rack, and of course ninety per cent or more are dull and worn out instruments.

The rack in the Allan table in use had a capacity of about one hundred and twenty-five burs and try as I would, I could do no better than have it filled with worthless burs and of course a vast waste of time occurred as a result. But the time came when this condition could be tolerated no longer and something better must be substituted, so this rack was abandoned and replaced with a special rack system devised to suit my own individual requirements.

In Fig. 2 is shown the present bur rack system consisting as it does of small separate units. The one is drilled to hold just the set of burs used in ordinary cavity preparation. Another for the instruments used in inlay preparation. A third for stones and polishing instruments. The short racks are for the same instruments for the right angle. An individual rack for each separate class of instruments.

Now then in practice, when a cavity is to be prepared, the assistant puts the desired rack upon the bracket table and there are before

me and available, only those instruments which are needed for that work and none other. Not only that, but there cannot be a lot of duplicates and dull burs because there is no room for them.

As fast as a bur is discarded its duplicate can be instantly reached from the stock drawer, with the eyes shut. Whatever the class of work is on hand, only the few instruments needed specially for it are placed in sight. Some of these racks are in duplicate, some in triplicate, so there is never any waiting for burs to be sterilized as patients are changed, and when any are needed in the Annex, they are taken there without loss of time.



Fig. 2.

Under our method of operating, this "unit" system of racks appears to "have filled a long felt want," for after extended use, no necessity for any further change has developed. They are time savers indeed, and naturally with better burs at hand with which to do the work, better results can be expected.

Undoubtedly one of the greatest disadvantages with which the busy operator has to contend to-day, is the inferior quality of his engine burs.

Unless a new bur will rapidly "cut" its way into a tooth cavity, it is not much of an asset in the Efficiency scheme, and yet such a one is not readily found, and time lost in trying in vain to cut into a tooth is time lost forever.

A carborundum wheel is carried on the end of the cable at the engine head, and the moment a bur ceases to cut to advantage, its end is held squarely against this revolving wheel, when in the twinkling of an eye, it is transformed into a rapid cutter. A round bur is thus converted into a kind of an inverted cone, with numerous little ragged sharp points projecting which while they last will "swipe" their way through even enamel much more rapidly than when the burs are new. In Fig. 3 is shown a recut bur.



Fig. 3.

DISK HOLDER.

In harmony with the general plan that instruments when needed should be at one's finger tips, the disk holder shown in Fig. 4 was devised.

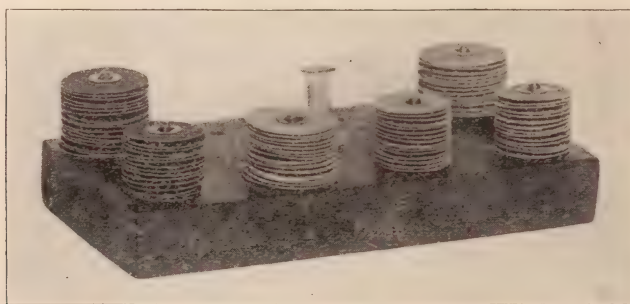


Fig. 4.

When disks are needed, this is placed right at hand upon the bracket table. All are thus in plain sight and accessible, and any one can be quickly snapped up as wanted. It is always reloaded from the stock before being put away.

Instead of having different grades of grit of the same material, then naturally of the same color and therefore only distinguishable from each other by close examination, each grit is of a different color and thus a glance is only necessary for selecting the one needed.

The same color scheme is applied to polishing strips, and thus many a second is saved in the selection of what is needed.

SALIVA EJECTOR.

To-day, under the methods employed, the saliva ejector ranks next to the engine as a time saver.

Times were when the saliva ejector was used only during short stages of our work, and thus the patient was free for conversation, and tactics of delay for a good portion of the sitting. But times have changed. "Talk is cheap" is no more applicable here than when one calls up "long distance," therefore every effort must be made to cut out the conversation line. Talking and the constant rinsing of the mouth by the patient, formerly the greatest of needless time consumers have for some time been, if not entirely cut out, at least reduced to a minimum, by the constant use of the saliva ejector.

The moment the patient is comfortably placed in the chair and before anything else is done, a saliva tube is adjusted and in a great many cases acts like magic. Many a patient that would be moving about in the chair and chattering at a great rate is instantly quieted and sits still.

It cannot be readily explained, but it is nevertheless a fact that this light rubber tubing acts as though it were a heavy chain, or it must have something of a hypnotic effect, for it certainly quiets down the patient wonderfully.

Do not for a moment think that I mean to infer that all patients are quieted in this manner. No indeed. Believe me there are some people who just naturally persist in telling how their great grandfathers died at the age of eighty-six and never had a tooth filled, etc., etc. You all know that story, and undoubtedly some strong arm work is occasionally required in these cases.

"Watch your step" is all right, but this is no place for the "stop, look and listen" song. Even with the rubber dam and clamp in place and a napkin or two besides, we cannot keep these patients from talking, but if we persistently appear not to be able to understand (owing to the many devices we have placed in the mouth partly for that purpose) the most stubborn will finally yield and allow us to proceed in peace.

With the saliva tube in place, backed up by duct compressors at times, work of various kinds in different parts of the mouth proceeds successively without interruption. The dam may be

changed for napkins, or vice versa, as the different work requires, and all the time the patient has not moved. Work may be easily carried on anywhere from thirty up to sixty minutes, the napkins removed, the mouth sprayed out, and then, and not till then, is the tube removed and the patient given a glass of water preparatory to leaving the chair.

When it comes to cleaning the teeth, with the tube in place, the work frequently proceeds uninterruptedly for the entire setting.

The saliva ejector therefore becomes one of the greatest factors of Efficiency for the time saved by its use is incalculable.

However, as far as I know, the saliva tubes in general use and the methods of keeping the oral cavity dry during operations, are generally speaking, the same to-day, and just as unsatisfactory, as they were thirty years ago.

Appreciating the disadvantages and inefficiency of these saliva tubes in question, and recognizing the absolute necessity for something better, an entirely different system for keeping the mouth dry has been worked out.

Those of us who have the misfortune to "live behind the levee" know full well that the problem is to keep the water out, not to let it in, then pump it out.

So the effort has been made to keep the water from flowing into the mouth as much as possible and at the same time syphon out that which has escaped.

No one form of saliva tube could be expected to do the work to the best advantage under the various conditions obtaining in the mouth. So several shapes were made, each best adapted to certain kinds of work.

In Fig. 5 are shown the various devices now in use and possibly other forms will suggest themselves later on.

Here are also seen compressors for Steno's duct and also cheek distenders which not only effectually seal that inlet but also cover up and take care of a large mucous surface.

The ejector for the duct of Steno is naturally used in conjunction with the one under the tongue, both being connected by a Y connector.

These appliances are strong factors for better dentistry as they allow of certain cavities being easily kept dry which results would

otherwise be extremely difficult or absolutely impossible to accomplish.

One has only to go into an up-to-date surgical operating room and witness the facilities with which the ordinary surgeon, or extraordinary surgeon if you will, is provided. Note how his field of operation is exposed, and the many assistants at hand, to do the most of work for him, and then compare what is seen with the very unfavorable conditions usually confronting the dental operator!



Fig. 5.

1. Flat end tube for general use.
2. Same, but arranged to fit the *Melig* clamp and so held securely in place.
3. Saliva tube and tongue guard also attachable to the *Melig* clamp.
4. Large perforated disk for taking care of the duct of Steno and a good part of the mucous secretion of the cheek (made in right and left).
5. This is used in conjunction with 1, 2 or 3 and connected by Y connector.
6. Large compressor covering a large part of the cheek and Steno's duct.
7. Cheek distender only.

EMERGENCY SALIVA EJECTOR.

One of the most aggravating disturbances of normal conditions is to have the saliva ejector cease to "work" when most needed, that is when in use upon some special patient upon whom a "crevasse" occurs immediately upon its cessation.

The remedy lies in having an emergency ejector such as is shown in Fig. 6 so arranged that it may be quickly connected by a short length of rubber tubing to the little outlet which supplies the water to the drinking glass.

This appliance should always be in order and kept in its proper place, that when necessary it can be put in commission without appreciable loss of time.

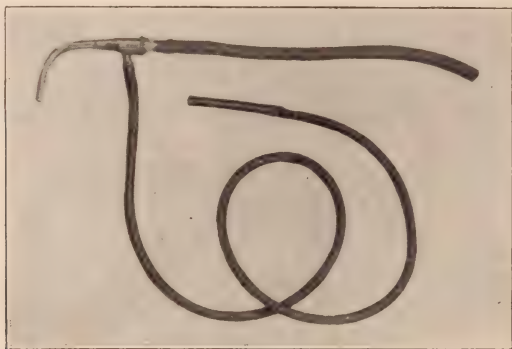


Fig. 6.

COMPRESSED AIR.

Compressed air appliances camp right upon the trail of the saliva ejector as time saving devices, but their numerous invaluable uses, both in the laboratory and operating room, not being new, are not to be touched upon here.

ACORN CONNECTORS.

But air syringes can get out of order, sprays stop working, and rubber tubing may get to leaking and either usually happens at an inopportune moment. If, therefore all such tubing is fitted with "slip joint" connectors, they may be instantly interchanged.

The ordinary automobile tire pump "Acorn" connectors are fitted to all our air syringes and sprays and thus they are interchangeable, and when necessity arises may be taken from one office to another without loss of time.

WARM AIR SYRINGE.

A jet of warm air is a necessity in a dental office. If there is a good warm air syringe on the market—one really satisfactory in every way—the writer has failed to discover it. So far each one tested contained some one feature or another rendering it impractical in his hands.

Removing a tip from the S. S. White No. 38 syringe and fitting

it to the Clark air syringe, turned the trick. After this point is held in a Bunson flame for two seconds, sufficient warm air will be supplied for the final drying out of any cavity.

This is naturally both a cold and warm syringe combined, and its simplicity is a great advantage. One of these syringes is connected at each side of the chair and thus the one or the other is always at hand for the assistant, no matter upon which side she is standing.



Fig. 7. Warm air syringe with "Acorn" connector.

BRACKET TABLE.

While it must be admitted that a piece of polished plate glass forms an ideal bracket table from an esthetic point of view, its appearance is its only attribute, for its inefficiency could probably be rated at one hundred per cent.

A multi-drawer table is not in the running on its appearance, but its time saving qualities leaves any other form "at the post" in the race for Efficiency, therefore it is indispensable where time is to be considered, for appearances must not be the only consideration.

Herein can be kept the comparatively few instruments and materials which are used on nearly every patient. Countless minutes must be wasted every day by the user of a plain sheet of glass, while conversely, countless minutes can be saved and many seconds split

by having these instruments and materials constantly at one's finger tips in the bracket table.

TRIPPLICATE INSTALLATION.

With two operating rooms in commission, the bracket tables should necessarily be alike, the drawers be interchangeable and equipped in duplicate, while a triplicate set of these drawers and their contents is kept also in commission. Fig. 8.



Fig. 8.

With such a triplicate installation, when some rapid-fire occasion presents, patients may rapidly follow each other without the loss of a second of time caused by waiting for instruments to be sterilized and put in order. The instruments which have been used are removed for cleansing, the drawer with its unused instruments removed bodily, and its duplicate or triplicate as the case may be, quickly shot into place, on the order of loading a magazine gun. And this may occur either in the main operating room or the "Annex."

It may be safely stated that the creation of this "Triple Entente" effect has proven one of the best links in our chain of Efficiency.

RUBBER DAM.

In many instances, owing to the nature of the case, much time may be saved by adjusting the dam at the beginning of the operation.

Sometimes during the process of the preparation of the cavity, the dam may be perforated or torn by accident and at other times,

even though no accident to it has occurred, a small leak cannot be stopped.

If, under these circumstances the dam is removed, and another piece applied, the chances are that the patient will insist upon rinsing the mouth and indulge in more or less conversation.

Again the removal of the dam and the replacing of a new piece is unintentionally an admission of an error in technique.

Now then, under these circumstances, the first piece of dam is never removed. The clamp and exposed teeth are touched with Frostilla, and a new piece applied right over the original one, and thus much time is saved and no error of technique is virtually admitted, however much it may have occurred.

In using the dam upon the lower posterior teeth, the tongue is everlastingly pushing it up right in the way. To overcome this annoyance, the dam is held down and out of the way lingually, by the use of a tongue holder, and thus much time is saved and the liability of injury to the dam by the engine burs or disks is greatly reduced, if not altogether eliminated.

MOUTH PROP.

There are many little annoyances met with in daily practice which, like the fleas on David Harum's dog, help to keep our minds from our other troubles, and the one which pretty nearly heads the list is the constant closure of the mouth by the patient.

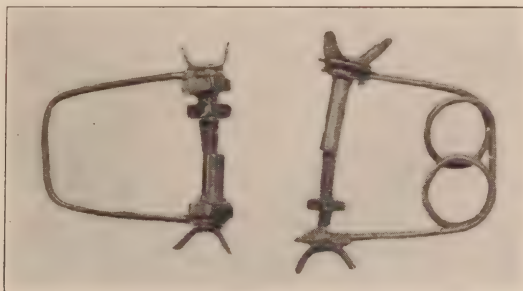


Fig. 9.

The energy expended by forty thousand dentists every day in repeating the phrases, "A little wider please," "Please open your mouth," would probably propel a six cylinder car from one end of the Lincoln Highway to the other. But instead of being thus utilized, it is wasted.

If there is a satisfactory mouth prop for sale, some agent has slighted me. But many others haven't, as quite a number of unsatisfactory ones are amongst my junk.

The ones shown in Fig. 9 were devised in a fit of desperation, and for that *fit* the writer has been ever grateful.

At the moment of use, softened modeling compound is put in each of the cups, the patient closes upon them, and the compound is pressed against the labial surfaces of the teeth and then chilled by a blast of cold air. The proper adjustment is quickly made by the nut and this adjustment may be changed if necessary at any time while in use.

With this appliance in position the patient can vary the opening of the mouth at will which is most restful, while this action in no way interferes with the immobility of the prop.

These instruments are no inconsiderable units in our general Efficiency scheme, shortening the duration of the operation by cutting out waste of time and incidentally by making the working field more accessible, better results are obtainable.

THE THIRD HAND.

Times were when not infrequently a third hand was wished for.

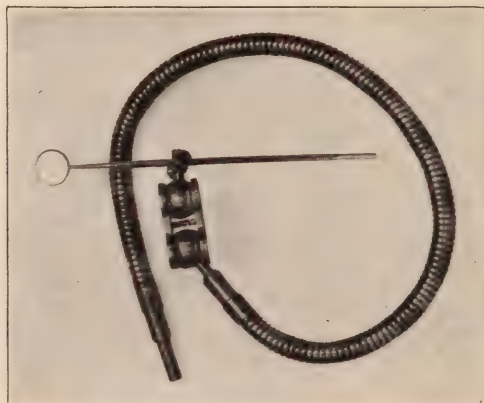


Fig. 10.

A "wish being the father of the thought" nothing could be more natural than for the thought to become the father of the device, and so such a device was created.

To a socket secured to the back of the chair a flexible arm may be attached at will. Upon the end of this arm is an adjustable double ball and socket. A mirror clamped in this device may be quickly adjusted to any possible position in the mouth and automatically held there. The nozzle of the compressed air may be clamped in such position as to keep a root absolutely dry while the cement is being mixed for the setting of a crown and other uses can naturally be found for such a "handy" little device. Fig. 10.

SOLDERING CLAMP.

Necessity being the avowed mother of invention, the soldering clamps shown in Fig. 11 were devised because no form of clamp thus far seen would do what was wanted, and some clamp really was indispensable for quickly and accurately adjusting and holding two or three pieces in contact for soldering.



Fig. 11.

The novelty of these clamps is distinguishable at a glance, their general field of usefulness in the laboratory is extremely wide and as a time saver they rank well up. Pullen clamps may be held in their jaws and thus their field of usefulness widened, and again the two parts of a broken denture may sometimes be held in exact apposition, while melted wax is dropped upon them. They certainly are capable of doing many things in the soldering line which no other clamps can accomplish, and thus form another link in the chain of Efficiency.

FROSTILLA.

The loss of a few seconds repeatedly during the day from the same cause is not only a reflection upon one's methods, but at the end of the week, the sum total of all these losses is of undoubted

moment. Adjusting the rubber dam is an instance where much time may be lost by the dam refusing to slip over the clamp or between the teeth.

A little jar of Holmes' Frostilla is kept at hand with a clean pipette in it always ready for use. At the moment of adjusting the dam, in the twinkling of an eye, the assistant has dropped a little Frostilla upon it on the right spot, and possibly in places a couple of drops are put on the teeth, whereupon the dam will slip on with ease (as a rule).

The advantages of Frostilla over soap or vaseline are that it is more agreeable to the taste and is much more cleanly.

Frostilla is always smeared into cavities—when necessary—before packing with inlay wax which insures the ready removal of the model. Root canals are always coated with it when post crowns are being tried in.

By these various uses of Frostilla, many a second may be clipped off of a busy day's run. Of course these are not the uses for which Frostilla was originally intended, which was for the skin, and I know of nothing better for the hands of the dentist who must wash them so frequently during the day. Diluting it with Pond's Extract is considered advisable.

"NEAR GOOD."

Amongst dental instruments there are many that are good, probably just as many that are of absolutely no use (just made to sell) and yet again a third class, a kind of "near good" quality. These last are usually of good design, but just at the last moment the designer "slipped a cog" and the result was a disappointment.

NAPKIN HOLDER.

The King Napkin Holder is of the last class, to my mind. The ratchet adjustment is where the designer "took the mat." The range of motion at the tip of the instrument controlled by each tooth on the ratchet is entirely too great.

A napkin holder on this order being sadly needed and this one being so nearly good, an effort was made to overcome its objections, the result being as shown in Fig. 12. By removing the spur which engaged the ratchet and replacing it by a screw, the most gradual adjustment may be obtained. This slight change has transferred the instrument from the "near good" to the really good class; it

has become absolutely indispensable and it is one of the strongest links in the chain of Efficiency.

This is the appliance with which the dam on the lower teeth is held down and out of the way as already referred to.



Fig. 12.

INDEX.

In every dental office there must of necessity accumulate a score or more of instruments and appliances which are very seldom required and therefore when one is suddenly needed, the question arises as to just where has it been safely tucked away for such an emergency, so very safely that it cannot be found at the moment.

If an index is kept of such articles, when the emergency arrives, the desired appliance can be located without the loss of time and annoyance, the latter being frequently the greater evil of the two.

MORSON'S CREOSOTE.

This paper would be incomplete did I fail to mention the higher Efficiency which may be obtained by the use of Morson's Creosote. Possibly the same results may be obtained by the use of other brands, but I know not of them.

A cavity may be prepared, dried and appear apparently O. K. It is touched with a pellet of spunk saturated with this creosote, and dried by spunk again, when lo! a change has taken place.

Some little spot (or spots) has turned either whiter, or dark (nearly black)—sometimes the one, sometimes the other. Why I

know not, but the change is there, and that means that the spot in question is softened tissue and must be cut out.

Under no circumstances is a cavity ever filled before going through the creosoting test, for by no other means of which I know can the thoroughness of its preparation be so well assured.

TEAM WORK.

It was stated that the victory of the American Team at the last Olympic Games was mainly due to its "Team Work."

At first thought one might wonder how team work could be applied to a dental practice, but upon a close study of the subject, one finally concludes that a dental office opens up a very wide field for its practice, if Efficiency is the objective.

By good team work the operator and his assistant together can accomplish vastly more work than can be done without its exhibition, and at the same time much of this work can be of an improved quality.

However, the patient himself must not be excluded from this team, but on the contrary should become an important factor thereof. He must be made to understand that unnecessary interruptions greatly retard the work and refractory patients must be quickly brought to terms sometimes by being put through the "third degree" of a mild type by the unnecessary use of the dam, napkins or tongue holder—especially the latter. Some patients would cheerfully waste from twenty-five to fifty per cent of the time reserved for them if allowed to do so, and during these strenuous times this waste must be prevented—that's all there is about it.

In a good day's work the dentist must necessarily make thousands of motions. Each and every one of these motions of which he can be relieved by an assistant, gives him the opportunity to make some other motion at the same instant, thus doubling his capacity at the moment.

Now here's where good or bad team work comes in. Every single motion of which an operator is guilty, because it could have been made, at the instant by an assistant, constitutes a lost motion, and bears the same relation to the lack of good team work upon the part of the operator, as a bit of lost motion in a machine bears to the skill of the engineer running it.

Thus it is up to the busy dentist to eliminate all lost motion by

carefully training his assistant in order to effect the highest degree of Efficiency.

The assistant naturally should be thoroughly trained to anticipate the operator's needs. A motion of the head or hand, one finger raised, two fingers, a look, a shake of the head is all that is required to produce what is wanted. Ofttimes when such a Marconi system has been working at high tension for the previous half hour, the patient will say, "It certainly is wonderful how your assistant knows just what to do, without your ever saying a word to her," and of course it is past comprehension under the circumstances!

THE LAST CRY IN EFFICIENCY.

When the recent dental graduate begins practice, he may usually expect to have ample time on his hands for a while, at least, so that a trained assistant at the chair will not be immediately necessary. But that is the real time for him to so lay his lines and begin to work upon a "system" which can be expanded in the future just as often as the exigency demands. The time should soon come when the employment of such an assistant becomes imperative, and then his "system" and Efficiency schemes can be proven.

Then, when in good time the flood tide comes in, the "last cry" in the Efficiency campaign will be the use of a second assistant at the chair.

Time has well proven that. With one assistant, an operation may have been completed a little ahead of scheduled time, and there not being sufficient time left of that sitting—under those circumstances—to accomplish anything more, the patient is leisurely dismissed and the chair may be vacant for a few minutes pending the arrival of the next patient.

Now those exact conditions may again obtain, but under the existing circumstances—that is with two trained assistants at hand—the patient is not dismissed this time. A peculiar glance at the clock (which glance is part of the "system") is instantly comprehended by the assistants. One word—"gold" "amalgam," or whatever the nature of the filling material will be, is all that is necessary. They immediately get busy, or rather we all get busy, and within the allotted time, another definite piece of work for which there is a definite charge, has been accomplished and thus the day's output increased accordingly.

All day long while this tide is in, the second assistant proves her constant value in many ways.

Under this "system" and with the Efficiency thereby attained, it is not so very unusual to have a patient remark at the conclusion of a specially favorable piece of work, "That job was certainly neatly and quickly executed," or words to that effect. Without exhibiting our mortification at the calling of a piece of highly scientific and artistic dental work a "job," due of course to the lack of education of the public, I can but suggest that when six trained hands concentrate their efforts upon one little inoffensive tooth, something is bound to happen rather suddenly!

Year by year the practice of dentistry becomes more arduous and difficult. No matter how busy one is or how pressing the work may be, none should be undertaken that cannot be given all the time it may require.

Deep cavities must always be partly filled with cement (*an oxychlorid only*) before being filled with amalgam or gold foil. All amalgam fillings must be polished at subsequent sittings. Teeth must be well separated before proximal fillings are attempted, all of which takes time.

Margins of cavities must be polished with fine cut burs or fine stones. Cavities must be tested with creosote, dried with chloroform or alcohol and hot air when necessary, and at other times with hot air only. This all takes time.

Crowns and bridges and prosthetic work generally try our souls. Inlays! Let's skip them by. And these take time.

Root canals, well the less said about them the better. In the first place the name is a misnomer. The word *canal* naturally brings to our mind a body of water, long and wide and rather straight. The Panama Canal rises first in our thoughts at the word, and there is something tangible to such a canal. But there is nothing of any such semblance in a tooth. Root *crevices* would be much more appropriate, to my notion. And these surely *all* take time, and time a plenty.

Thus it is that to obtain the best results—and none other must be satisfactory—a world of time must be spent on the work itself and therefore all the more reason for employing every known method for cutting out all waste of time, and increasing our Efficiency.

"No one has a hunch on knowledge or ingenuity." That's a

quotation. I would not use such an expression. They are both as free as the light-winged birds of the air—that's original and undoubtedly sounds better (though I think I've heard the expression before) and he who recognizes the weakness of his present methods and appliances, of his system and inefficiency, and is ever on the alert to originate or appropriate ideas and devices which will better meet his requirements, must meet with the success which he deserves.

DOES IT PAY?

Once upon a time, long ago, I visited one of the most prominent men in our profession whose office was on Fifth Ave. He was a man of recognized ability and he certainly could deliver the goods.

I had happened in most opportunely, for good fellow that he was, he had recently worked out some new detail in crown work, for which he had devised a special instrument, and he wanted me to see it.

His patient was in the chair, the moment had come for the demonstration of the stunt in question, when lo! the instrument needed could not be found. High and low (low meant down two flights to his laboratory in the basement) he searched. Nothing doing! Finally he gave it up and did the work in his old fashioned way, his remarks at the time being now omitted, having been "deleted by the censor."

Splendid dentist that he was, this man could not stand the pace—lost out through lack of system. The tide caught him at its ebb, and he is down and out. The usual story you all know so well.

It surely must pay to so conserve our energies and our time as to be able to meet every new issue squarely and turn it to our advantage.

It surely must pay, as each year glides along with conditions constantly changing, to continue forging our chain of Efficiency, link by link, each new link a little stronger than the last—and each link representing some important new detail—some method or device, it matters not whether original or pirated, which will assist us in speeding up to the trend of the times.

Now Mr. President and members of the St. Louis Dental Society, I have given you as briefly as I consistently could, a portion of the "Gospel of Efficiency" as practiced in far away Dixie by means of which, keeping pace with the constantly rising ideals of dentistry, has been attempted.

And we must not forget that in the matter of raising these ideals of dentistry, the St. Louis men have done their full share.

While I realize with deep regret that I was unable to produce something startling for this evening, I sincerely trust, I do indeed, that I have at least given you something to think about.

Note.—Attention is called to the crudeness of these appliances and how readily any dentist who so desires can duplicate them.

The jaws for the soldering clamp were taken from an Ivory clamp. The saliva tubes, etc., are made from ordinary brass wire, sheet brass and copper tubing, and all the other appliances are easy to make or have made and inexpensive.

THE MYSTERY OF PAIN AND ITS DECEPTION IN DIAGNOSIS.*

BY J. G. REID, D. D. S., CHICAGO, ILL.

For fear the caption of this paper may mislead you in regard to its contents, I will state briefly that it will present no startling revelations.

To adjust myself and my discourse to the special problem confronting me is something like trying to dam up the waters of Lake Michigan with a small bag of sand to stop its outflow.

The incentive which prompted me to present a straggling thought on this subject was a short editorial in the DENTAL REVIEW on, "A Plea for Diagnosis." Possessing some knowledge as I do regarding the apathy evinced by the majority of the dental profession in reading the literature presented, I am constrained to believe that this editorial may have been overlooked by many; and therefore am going to take the liberty of making a partial quotation therefrom. It says: "One of the most pressing needs in the dental profession today is a better diagnostic sense on the part of its members. * * * It is of course a fine thing to carve occlusal outlines on a porcelain crown or to reproduce anatomical forms in inlay work. These things are necessary * * * but the thing that is too frequently overlooked or ignored, is the ability to accurately diagnose the various conditions which are daily presented to the dentist for solution. There is altogether too much guess-work and in many instances too great a degree

*Read before the Odontological Society of Chicago, Dec. 8, 1914.

of indifference, when it comes to diagnosing morbid conditions of the mouth." I must show a little bit of antagonism with the editor in regard to "degree of indifference." It is not so much a "degree of indifference" as it is the lack in knowledge of how to do it; all of which is brought about by being indifferent in the acquirement of equipment for emergencies that arise requiring a skillful and accurate diagnosis.

Again he says: "It will usually be found that the man who excels in diagnosis is the one who has applied himself most assiduously to the study of the phenomena of symptoms, and who has long been a close observer. * * * Every young graduate should make this question of diagnosis a serious study and look upon it as one of the most important functions of his practice." Here I most cordially sympathize with the editor in having to acknowledge that, "the importance of diagnosis is not sufficiently emphasized in the College Curriculum." This is the very place where a substantial foundation should be constructed. In this age life is too short with all of our present enlightenment, for a young man leaving his college door to be compelled to go groping about for that information which he most needs when entering a practice.

I recognize that in my endeavor to emphasize the foregoing thought, much has been overlooked; but it will at least be sufficient to bring out the importance of a more thorough and definite understanding of the succeeding thought.

From the earliest recollection of my professional experience down to the present time, a keen interest has been constantly manifested in the observation and action of pain within the region over which it is my privilege to preside.

The mystery of pain furnishes a charm that develops very gradually into an interesting study; and any one who desires to follow closely the channels of cause and effect governing the manifestations of pain, will at once be convinced that it is a subject of no small importance to comprehend and understand in all of its details.

I believe that I am conservative when I say that there is no locality in or about the human economy that will furnish the dentist or the general medical practitioner with a more or greater variety of interesting studies of pain than are to be found associated with the nerves of the head.

I suspect that the rank and file of the profession do not fully appreciate the significance of pain under all circumstances, and this is especially true when its development appears in a mysterious manner in or about the organs of the head such as tonsils, teeth, tongue, sinuses, etc.

"There is no other clinical condition which makes such demands on the dentists or physician as the sensation of pain. People will let other things drift for years, but their demand for relief is immediate upon the occurrence of pain. A little study of the subject, however, will show that pain, far from being the enemy of the animal, is the means of its salvation.

If we regard pain as an exaggerated feeling, we can begin to see just in what way pain is a friend rather than an enemy. There is no more reason to believe that the nervous system would misbehave than would any other part of the body, and when any nerve begins to set up a cry of pain, then it is time to go cautiously. Pain means something, and cannot be neglected. If conditions are right in the body we do not have pain, but when things begin to get seriously wrong we get the phenomena called pain.

It is doubtful if we can find a normal individual who suffers from pain. Consequently we know that where we have this phenomena to deal with that something abnormal exists, and it is a good practice to ascertain just what is wrong before relieving the pain that is present."

In going along let us not overlook the significant fact that pain does not always convey correctly the actual seat of a malady, and herein lies the road to the commitment of a radical error, if one is the least bit inclined to act upon the suggestion of this one symptom alone. I admit and at the same time lament the fact that I have fallen into such a pit, but it is a consolation also to know that I have found some good company in the same place.

Some of the most mysterious and deceptive pains that are likely to confront the dentist in determining a satisfactory diagnosis, are those that originate in some remote part of the body and are referred or focalized in one or more of the teeth. Such a phenomena is not relatively speaking of common occurrence; however infrequent such a problem may arise, it is sufficient at the time to cause one considerable anxiety if suddenly called upon to give prompt

relief, wherein the local conditions point conclusively to such a contrary diagnosis.

Pain is a very important sign of disease, and it is always necessary to carefully ascertain its character and location; repeating again that it is often felt at a distance from the seat of the affection.

We as practitioners are most likely to associate pain with an inflammation, or an ulceration, or from a sudden or gradual solution of continuity in any of the tissues of the mouth. It is, however, frequently experienced in a severe form when none of these conditions are present; therefore when we proceed to consider pain from a diagnostic point of view, we should preface this observation by asserting that pain, whether local or general, may be illusive as to both seat and cause. In addition to what has already been said we must view with some reservations these phenomena as they are exhibited in individuals.

"When a person complains of having a fever, out comes the thermometer and a record of the temperature is made. So far as the fever is concerned the facts can be recorded just as they are. The same holds true of many symptoms. When it comes to pain all is chaos because there is no way of accurately knowing the facts. If the pain is exceedingly violent there may be a nervous rigor, but some individuals have chill from shock easier than others. Sometimes the pulse becomes rapid or even irregular, but that is only in extreme cases. Ordinarily we must judge of pain and tenderness by what the patient tells us, and right here is where the record is most likely to become muddled. A stoic belittles his pain; a nervous person exaggerates his. There is no way to check the account of either. Furthermore the localizing sense for pain and tenderness is poorly developed over most of the body. It is good in the finger tips, but it is poor on the shoulder blades. It is good on a skin surface as compared with internal structures. Again there is an uncertainty frequently arises from having to take the patient's word for it. What he tells you is after all only his interpretation of what he feels. His words may mean one thing to him and another to you. Abnormal feelings are differently interpreted by different people, all normal mentally. When it comes to people of poor mental poise, such as neurasthenics, hysterics, and neurotics, the embarrassment multiplies. The discovery that internal organs

cause external pains means a greater need for analytical study of pain. It is not a read-as-you-run proposition."

My hearers have already been supplied with much advanced knowledge and information, in a paper read before this society by Dr. Joseph C. Beck, touching upon the question of referred pains that go chasing through the cranial nerves; a region wherein he recognizes himself the deceitfulness of pain and the extreme carelessness engendered in diagnosing the same when of dental origin. Many harmless pulps have been deprived of vitality, legions of teeth have been ignominiously sacrificed, and a countless number of jaws go endentulous today, all more or less traceable to a faulty diagnosis of referred pains. With these admonitions staring us in the face, how much more grave the situation becomes to those who are called upon to discover obscure areas of disease in deeper seated localities of the body. And right here let me drop a hint that we must not be too hasty in assuming that we have dominion over all of the recognized ills that flesh is heir to. The road we travel is not all macadamized—a rut here, a muck-hole there are but emblems placed along the highway to warn us of imposing and problematical questions which will require a settlement by both the dental and medical man.

It is obvious without comment that to understand pain and its mysterious and unexpected development requires one to be master of the nervous system.

"The nervous system that we all know about is called the cerebro-spinal system. There is still another system which we call the sympathetic. The latter system is not under brain control to the same extent as the former system. It is now known that the sympathetic nervous system is a part of the cerebro-spinal nervous system."

We must not under-value the necessity of a better understanding of these two systems, if we expect to reach a high state of perfection in the art of diagnosing pains.

It is natural to suppose that the transmission of an impulse characterized as pain must necessarily travel over many roads and in its travels there is not much to prevent its being shunted into an undiseased locality quite remote from its origin.

I fully appreciate that the foregoing thoughts upon this subject are but a scratch on the surface of a most interesting topic and any further amplification of the question would be both tedious

and burdensome, therefore will conclude the effort with a recitation of two interesting cases. (These cases are reported in the discussion).

A FEW POINTS ON THE TREATMENT OF PYORRHEA ALVEOLARIS.*

BY ERNEST STURRIDGE, D. D. S., L. D. S., ENG.

Mr. President and Gentlemen:

I shall not trouble you with the details of histology and pathology of pyorrhea alveolaris, I simply wish to bring to your notice a few points in connection with treatment of the disease.

It is difficult to allude to a method of treatment of any disease without referring to the etiology of that disease, but I shall make my remarks on this as short as possible.

I can only conceive the disease, (in its incipient stages) to be due to local irritants, the presence of which produce in the tissues a local inflammation, which is accompanied with bacteria infection. The micro-organisms, which are ever present in the mouth, only find access into the tissues, when they become inflamed.

The tissues in time break down under the strain of chronic inflammation, and this constitutes the slowly progressive, wasting disease of pericemental membrane and alveolus, associated with the production of pus.

It is impossible for any of us to determine at what stage in the incipient inflammatory process the tissues first yield to the infection of pathogenic bacteria, but it has been clearly demonstrated by many eminent pathologists that bacteria are to be found in the deeper layers of the pericemental membrane and the alveolar bone.

From this field of infection they pass into the general circulation and when the resistance of the body becomes incapable of dispersing the toxins thus introduced, the alimentary tract also becomes a channel of infection through absorption by the weakened alimentary mucosa. It is then that the local site of infection becomes most intractable, and the pyorrhea difficult to cure.

With this briefly summarized conception of the etiology of the disease in mind, we have to consider the most effective means of dealing with the numerous exciting causes of the disease.

* Read before the American Dental Society of Europe, July, 1914.

I propose to draw attention to the treatment of the bacteria phase of the disease only. We are all agreed that the removal of all foreign matter from the site of infection is necessary, and I shall say nothing to this body of experts about instrumentation. I know that a great deal can be done toward the cure of the disease by careful and skillful instrumentation, and the ordinary use of antiseptics applied to the pockets, but the point I wish to make in this paper is, that more than ordinary antiseptic measures are necessary in dealing with bacteria which have penetrated the tissue beyond the reach of antiseptics applied to the surface of the pockets.

Active foci of pyogenic organisms are liable to remain in deep-seated positions in the tissues and keep up a subtle inflammatory condition, which may not be obvious at first, but sooner or later cause relapse. To obviate this contingent, I have for a number of years resorted to the sterilization of the tissues by the introduction of antiseptic ions into the tissues about the roots of all the affected teeth, during and after instrumentation.

The scope of this paper will not permit of details of the methods of ionic medication, and I shall have to assume that you, gentlemen, are familiar with the technique of this method.

You will agree with me, that if it can be demonstrated that by placing an electrode into a pyorrhea pocket and by passing a few milliamperes of current for a few minutes, it is possible to impregnate the tissues, to a considerable depth with ions of a salt, which have been proved to be of high antiseptic nature, that this must be an effective means of sterilizing the tissues.

This is what I am doing in the treatment of all pyorrhea cases, and I am convinced from clinical evidence, that the penetration of the ions is effectively carried out. I have recently proved this theory of penetration of ions by experiments on gum, pericemental membrane and alveolus.

I operated on a dog in the same way that I ionize pyorrhea patients; the animal was anesthetized and an electrode passed into the pericemental membrane, with a current of five milliamperes for a few minutes.

The animal was then killed and sections of the ionized tissues and alveolar bone removed, and placed in a weak solution of ferricyanid of potassium. This treatment coloured the ferrous ions a Prussian blue, making them visible to the naked eye. I found that the penetration was most complete, passing deep into the alveolar

process, as the specimens which I have here, readily show. (Specimens passed around).

The gum tissue I had prepared for microscopic examination, and this you can also see, shows the complete saturation of the tissues with a large dosage of ions.

The claim made for this method of treatment by ionic medication is that, when properly carried out (in conjunction with skillful instrumentation) it supplies a means of overcoming a real difficulty which exists in connection with the treatment of pyorrhea; it impregnates the tissues with antiseptics which reach the bacteria in the deeper layers and completely eradicates them from this position.

The conclusions I have come to are that foci of pyogenic bacteria remain deep seated in the pericemental membrane and alveolar process, and that these keep up an inflammatory action which in time re-establishes the production of pus, if not destroyed; that this is the chief cause of failure in treatment; that the ionization of the tissues with antiseptic salts destroys these latent foci of bacteria and affords the requisite opportunity for the tissues to become immune to the influence of ordinary mouth bacteria.

Furthermore there is substantial proof that bacteria are introduced into the general circulation by *direct absorption* from the local site of infection; by the destruction of the organisms in the tissues, a vast number of killed bacteria are left in the tissues where they become absorbed into the general circulation, thereby providing antibodies which react in the same manner as antigenic vaccines.

This assistance to the vascular system in establishing immunity against septic infection, reacts perceptibly on the generalized symptoms, and the local condition also improves.

I must not be understood as implying that simply ionizing pericemental tissue will cure pyorrhea—far from it. There are a great number of exciting causes which must all be recognized and properly treated. I do assert however, that as an auxiliary in the treatment of the disease ionic medication is invaluable.

The duration of cure depends on a variety of circumstances, which center chiefly around the ability of the patient to carry out a perfect system of daily hygiene. Generally speaking ionic medication of the tissues adds to the lasting results of the treatment and helps us in our work on this troublesome disease.

PHOTOGRAPHS OF AMALGAM SURFACES PACKED
AGAINST CAVITY WALLS. SHOWING MANY
DEFECTS WHICH INDICATE THE NECES-
SITY OF A CHANGE IN OUR AMALGAM
TECHNIC.*

BY WM. E. HARPER, D. D. S., CHICAGO.

In the presentation of this subject I am reminded of the many and long continued efforts to improve our amalgam instrumentation made by our honored and esteemed member, Dr. C. P. Pruyn by having operators fill a short piece of glass tube stopped at one end to make a cavity, with paper pasted around the outside to prevent observation during the packing. Examination, after the completion of the filling would expose to view the amalgam packed against the glass cavity wall showing the defects in adaptation, as an evidence of the necessity of a change in our instrumentation.

I venture to say that sixty to ninety per cent of such fillings would show defects apparent to the naked eye, unless made by operators experienced in this line of work.

It is my purpose to convey the same object lesson, hoping to accomplish much greater good by illustrating to a large number at one time through our societies rather than by the slow process of individual demonstration.

The pictures I present are typical of the average results attained showing the location, extent, and frequency of defects; a knowledge of which I am sure will inspire the profession to seek and adopt an improved method of amalgam technic, if such can be found, and I beg to offer suggestions which my long experience in this line of work dictates, confident that much good will result.

In a paper on the subject of "The Character of the Adaptation of Amalgam to Cavity Walls," read before the Illinois State Dental Society at Springfield 1912, I related my own experience after having made four hundred test fillings, many of which had been made in the same kind of test cavity as now illustrated and with much the same result as shown in the pictures. I found it practically

* Read before the Chicago Dental Society, December 15, 1914.

impossible to eliminate these imperfections until I abandoned the use of large pluggers for the general packing, confining their use to the simple flattening of the amalgam to place, then packing the entire surface as each piece was added, using a small angular plugger of the approximate size of twelve by eighteen tenths of a millimeter in diameter with all the force of the pen grasp until no crepitus could be felt. With this modification of my amalgam instrumentation, I was able to eliminate the naked eye defects but the adaptation as measured by the air test still remained very uncertain, for about two-thirds of my fillings would leak at one to five pounds air pressure as was shown in the reports at that time presented.

This lack of uniformity continued with whatever alloy and instrumentation were used until I learned that extreme plasticity with compression was the secret key to uniform results in adaptation to cavity walls. This observation has been made conclusive by extensive experiments since its discovery, and has likewise impressed all other operators who have participated in the work since that time.

It has been stated by reliable authority that amalgam is used as a filling material for sixty to seventy-five per cent of the cavities the average practitioner is called upon to fill, and such general use makes it imperative that we spare no effort to do the best possible with so valuable a filling material.

At three clinics given during the past year I secured thirty test fillings made by thirty different operators, each using his own alloy, and amalgam technic. This work was done by experienced practitioners under conditions more favorable than when operating in the mouth. The character of the adaptation may be judged by examination of that surface of the filling packed against a solid matrix. More than two-thirds of these fillings show imperfections as apparent to the naked eye as shown up on the screen tonight.

These common defects shown by the removal of one of the cavity walls were a revelation to the operators making them, and impress in a most emphatic way the necessity for a change in our amalgam procedure.

Any sound of crepitus or evidence of setting apparent in an amalgam mix during the final kneading will result in a multitude of defects or cracks in the filling when packed. These defects are minute in that portion of the mass immediately under the plugger,



Fig. 1.

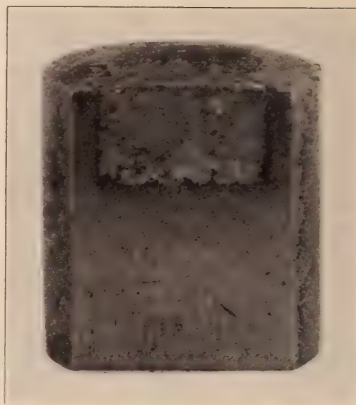


Fig. 2.

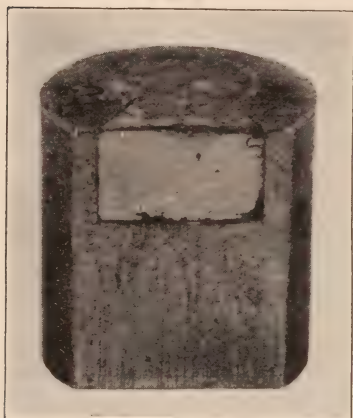


Fig. 3.



Fig. 4.

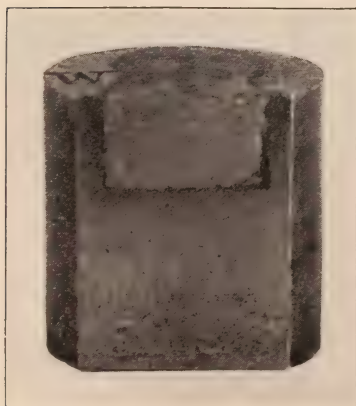


Fig. 5.



Fig. 6.



Fig. 7.



Fig. 8.



Fig. 9.

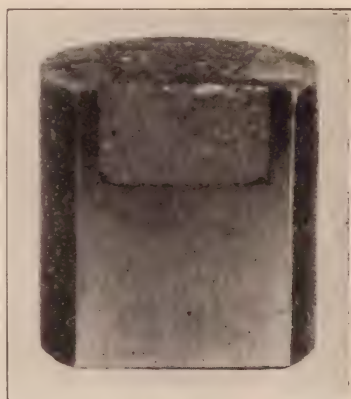


Fig. 10.



Fig. 11.

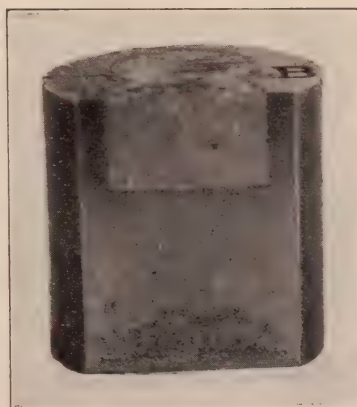


Fig. 12.

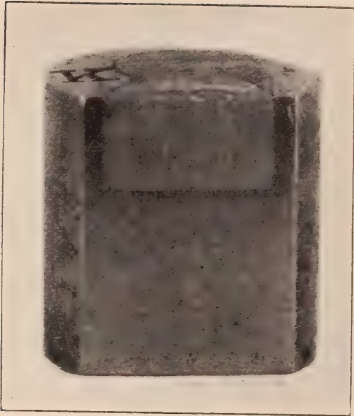


Fig. 13.



Fig. 14.



Fig. 15.

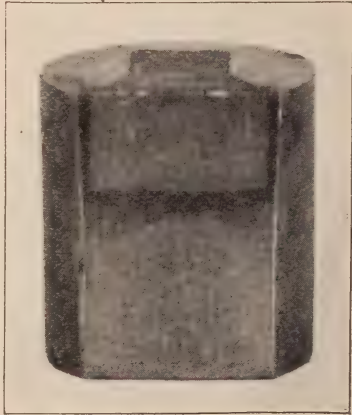


Fig. 16.

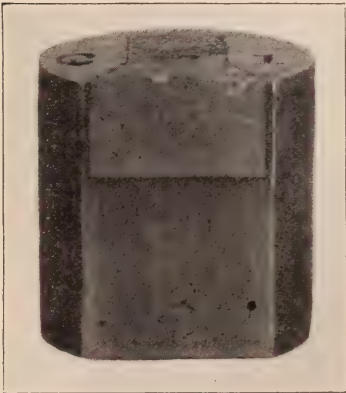


Fig. 17.

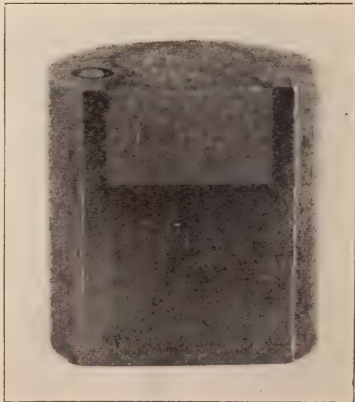


Fig. 18.

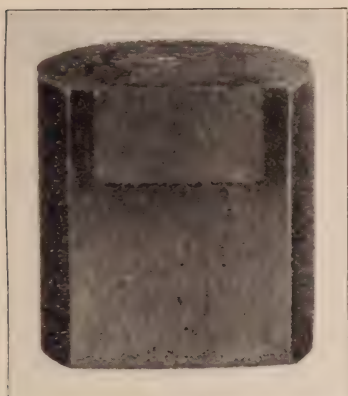


Fig. 19.



Fig. 20.

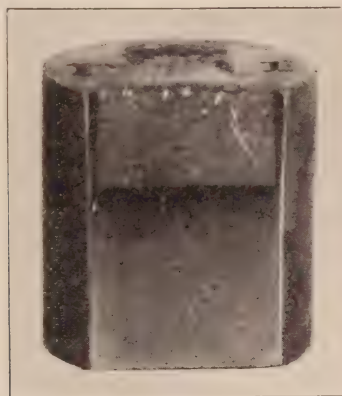


Fig. 21.

The test fillings, Figs. 1 to 21 inclusive, are made in mesio-occlusal cavities of typical form and size, requiring about 24 grains of alloy to fill; and the extent and frequency of the defects I wish to emphasize, as they are due to *faulty amalgam technic* and may be entirely eliminated by the adoption of a proper amalgam procedure.

Figs. 16, 17, 18, 19, 20 and 21 fail to show the numerous defects which are quite apparent to the naked eye in the original.

but are commonly quite apparent in the amalgam as it spreads from under the plugger; the unyielding character of that portion of the amalgam packed under the continued use of a large plugger makes it impossible to eliminate them entirely with the limited force of the pen grasp. The use of a small plugger for packing in average large cavities makes it impossible to secure compression, essential to adaptation and the strength of the filling, and requires too much time in the use of many of our alloys.

The directions presented are recommended as the best procedure for all high grade alloys.

Proportions of alloy and mercury vary in different alloys and may be found in the printed directions which accompany the alloy.

All dental alloys require a slight excess of mercury to enable us to make a perfect mix, but such excess should not be so great as to make a mass that fails to retain its form when made into a roll, after mixing two and a half to three minutes.

The insure accuracy—At convenient times the operator, or assistant, can weigh into capsules, ten and fifteen grains of alloy, and into other capsules the necessary proportions of mercury. These capsules are ready for immediate use without inconvenience or loss of time; and the use of alloy in definite quantities will result in a great saving of material, because the operator soon learns the amount required for any particular cavity.

If the operator will learn to use *only such excess mercury as is necessary to make a perfect mix*, such procedure will result in the ideal condition of plasticity of the amalgam essential to the most perfect and stable adaptation, avoiding the necessity of adding or removing mercury during the mixing, which is very inaccurate and uncertain, and will be found a common cause of those bulk changes which sometimes follow the use of our most reliable alloys.

Mixing—Proper mixing is best done by the use of a deep glass mortar, the inner surface of which has been dulled (not ground) and a pestle of such design as to afford a firm grasp being taken of the handle. The head of the pestle should also be slightly dulled.

The time required, and the rapidity of movement of the pestle necessary for thorough amalgamation, make the use of a shallow mortar impracticable, because of the danger of loss of some of the contents during the operation.

A rough inner surface of the mortar tends to grind the alloy, which is objectionable; to say nothing of the extreme difficulty in completely removing the plastic mass and keeping the mortar clean.

A complete mix is absolutely essential to a stable filling, and this cannot be accomplished in the mortar and hand in less time than two and a half to three minutes, a point upon which I would lay great stress, because at least ninety per cent of the operators it has been my privilege to observe take only half the time necessary to insure a complete mix. I use a sand glass or egg timer, which

hangs at a convenient place on the cabinet, to indicate the time (this appliance for timing has proved indispensable to me). It will be found a simple and convenient means of insuring the necessary time for a complete mix, and may be purchased from opticians or at department stores at a cost of ten cents and upwards.

The mixing in the mortar should continue for *two minutes* and from *half to one minute* in the hand, *by the watch*, using only moderate force, rather slowly at first to avoid losing some of the mercury, working rapidly after the filings have absorbed the mercury.

The excess mercury should be removed during the packing into the cavity, instead of during the final kneading. As a result of this procedure the consistency of the mass should be as plastic as is necessary to avoid any sound of crepitus or any indication of setting during the filling of the first half of the cavity, for the more completely the cavity is filled while the mass is in this very plastic condition, the better the result in adaptation.

Packing—Pack each piece of amalgam with a large flat serrated plugger, taking short steps, working from the center to and around the walls, inclining the plugger in such manner as to pack against the walls, using all the force of the pen grasp. As the excess mercury is expressed to the surface during the packing, scrape it off with the side of the plugger, repeating the operation with each piece of amalgam added. In angular and irregular cavities a small angular plugger must be used with force and thoroughness around all walls and in all angles.

The cavity should be filled to excess, and the thumb may be placed over the entire filling compressing the amalgam against all margins, at the same time removing the surplus mercury. The filling should now remain undisturbed for about three minutes, after which time it can be trimmed to form and lightly burnished to the margins, and polished at a subsequent sitting.

After trying the extremely plastic mix recommended, some operators have expressed themselves as preferring the packing qualities of the less plastic mix secured by expressing the excess mercury during the final kneading. To these so inclined, I urge and emphasize that each piece of amalgam be carried to the cavity and flattened to place with the large plugger; and that the general packing of each piece be done with a small plugger, using the

plugger with force and thoroughness. With such instrumentation it will be found possible to eliminate the naked eye defects, but the general adaptation, as shown by the air test, will be much inferior to that attained by the use of a very plastic mix.

The stability or permanency of form of our amalgam fillings (made with reliable alloys) is dependent upon the thoroughness of the mix. A thorough mix cannot be judged by the apparent smooth plasticity because such a condition is developed in all of our alloys long before the mix is complete.

Insufficient or an excess of mercury during the mixing may finally result in a smooth plastic mix, but careful tests on the micrometer and air tests will show by movement after the filling is made, evidence of an imperfect mix.

Time and rapidity of movement in the mixing are essential, and I beg to emphasize their importance. If the filling be done in the manner described, reasonably uniform results may be attained, and such procedure will allow the maximum time for the filling of the cavity.

The time suggested may sometimes be advantageously increased, but should never be less than the minimum stated.

In medium and average large cavities, adaptation cannot be secured with a reasonable degree of success unless the amalgam mass be in a *very plastic state*, free of sound of crepitus or any indication of setting, during the insertion of most of the filling.

Plasticity and Compression (using an alloy that hardens sufficiently to remain fixed immediately upon the removal of the surplus mercury) are vital factors essential to secure a non-leaking filling.

The only practical way of securing this necessary extreme plasticity in the high grade alloys that are sufficiently strong in their resistance to crushing stress and flow, is *not* to remove the excess mercury during the final kneading. The extra plasticity of the mass, a result of this procedure, will permit of perfect adaptation as it remains sufficiently fluid to retain its continuity as it is compressed against the walls and into the angles; hardening immediately with the removal of the excess mercury making a filling, of the maximum density.

The necessity for compression prohibits the use of smooth ball burnishers for the packing. Such instruments may, by thorough manipulation, eliminate the defects shown, but fillings

so made generally leak immediately when air pressure is applied; and their resistance to crushing stress and flow is much reduced.

In all cavities that will permit their use, large flat serrated faced pluggers that will grasp and hold the amalgam under the packing force should be used to secure the maximum compression.

The general applicability and greater convenience of hand pressure for packing amalgam may explain the fact that more than ninety per cent of the profession condense their amalgam

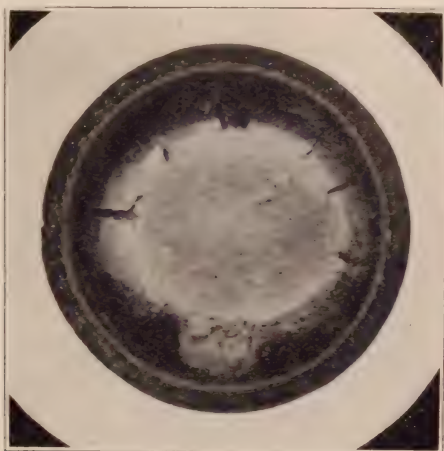


Fig. 22.

Fig. 22. The occlusal appearance of amalgam packed into a simple round cavity with one forcible thrust of a large amalgam plugger. This amalgam was sufficiently plastic to take the skin markings, and shows the tendency of amalgam to crack or break as it spreads from under the compressing force of the plugger. These checks cannot be obliterated by the continued use of a large plugger, as alloy in this condition is not sufficiently yielding under such force as it is generally possible to apply. A small plugger must be used for this purpose, but the adaptation secured by such instrumentation is decidedly inferior to that secured by the use of a large plugger and a very plastic amalgam. Small pluggers in large cavities are unfavorable to compression and unconfined amalgam cannot be packed into adaptation with any degree of uniformity.

fillings in this manner, although mallet force, with the aid of an assistant, may be used for cavities favorably located.

In the use of hand pressure a very limited number of amalgam pluggers are needed to meet the requirements of every day work. The following are suggested as being sufficiently complete:

A large plugger.....	35-7-10.
A medium plugger	25-7-10.
A small plugger	12x18-7-10.

If the excess mercury be removed during the kneading, the lack of plasticity or fluidity causes the amalgam mass when packed to break or form minute checks, as illustrated in the photographs; and these imperfections are commonly bridged over in the subsequent packing because the amalgam mass, after the initial packing, is not sufficiently yielding, under large pluggers to be packed or condensed with sufficient force to eliminate them, with the limited force of the pen grasp and the operating conditions of the mouth.



Fig. 23.

Fig. 23. Shows the same amalgam mass (as illustrated Fig. 22) as it appears against the floor of the cavity and again illustrates the tendency of the amalgam to break or crack as it spreads from under the compression of the large plugger, and explains the common defects shown against the walls and in the angles of the test fillings illustrated. If the amalgam be used in a sufficiently plastic state, it will flow as it spreads from under the compression of the plugger, retaining its continuity; and when this part of the very plastic mass is subsequently packed, it is condensed into a comparatively uniform density and generally into perfect adaptation if the packing be done with sufficient force and thoroughness.

The necessity for this extra plasticity becomes apparent when the air pressure apparatus is used as a test for adaptation; and is an essential quality the profession and alloy manufacturers have failed to recognize. Fillings defective in this respect cannot be recognized when tested by the micrometer, which is a measure of movement only.

Hundreds of tests show conclusively that we may have a wide range of movement, as shown by the micrometer, and the same alloy with the same technic packed into an average large mesio-occlusal test cavity may not leak at pressures of ten to forty pounds.

ANATOMICAL OCCLUSION.

BY B. A. SMITH, D. D. S., CHAMPAIGN, ILL.

In preparing this article on artificial dentures I have confined myself mostly to the subject of articulation or occlusion of the teeth, for in my mind, more depends upon this step than all others in successful plate work.

To demonstrate the importance of occlusion and how far reaching the appreciation of occlusion goes I will quote a little story of an old woman who was taken to the poor house. After she sat down, looked thoughtfully around her she said, "Well there is one thing to be thankful for. I have two teeth left, and thank Heaven they hit."

In speaking of occlusion there are many varieties, some of which are mal-occlusion, which should be mal-practice, instead, if done. Poor occlusion, which should be done over, if done, and anatomical occlusion which should be done.

In looking up the originator of anatomical occlusion I find that it was our Creator who first thought of this logical method of setting the teeth for our use. This method, as originated by Him, is simply the right and natural one. It is not a method originated by man, as many of our profession imagine.

In going farther I find that eminent men, long ago discovered this, the right way, and they have endeavored simply to develop scientific methods and principles to carry out the original plan of nature. They developed anatomical-molds for artificial teeth, the face bow to determine the proper relation of the condyles to the jaw to secure a protrusive bite. They developed anatomical articulators to be used in connection with the face bow which aids us to establish a compensating curve of the teeth, also, aids us to secure a lateral and protrusive movement of the teeth, to establish proper contact of upper and lower

teeth, all of which, if carried out, will save us the embarrassment of ill-fitting plates and many of the draw backs this part of prosthetic dentistry now has.

If you do not understand anatomical articulation look into your own mouth, or some one with a perfect set of teeth, and you will see anatomical occlusion. Set artificial teeth accordingly.

To bring out the importance of anatomical occlusion I will try to state to you how I made three sets of teeth, two not fitting, getting nothing for my trouble, one fitting and getting one hundred dollars and a good friend for life.

Some seven or eight years ago a gentleman, in this town, came to me saying that he wanted to try me on teeth, that he had six or seven sets made and they never fit. I told him right off that I could make them and would guarantee a fit. I was still young in the game. I took a plaster impression of his mouth, a biscuit bite, obtained the shade, mailed them to a laboratory requesting them to make a set of teeth shade 78. They did and returned them nicely finished up and I was proud to show my patient the plate. I put them in his mouth; they did not fit but dropped down and he went out discouraged, and I too. After a week's trial he brought them back. I insisted upon trying again, which I did. This time I took precaution in the impression, scraped the models, set up the teeth, tried them in the mouth before vulcanizing, finished up the teeth and was again proud to call in my patient, telling him that I bet that these fit. *They didn't.* We were both discouraged again.

I told him that I would think it over for awhile and I did, and firstly concluded that it was the fault of his mouth, but after carefully going over the whole circumstance I came to the conclusion that possibly I was not the best dentist in the world and maybe I could learn something if I tried. I called in my patient again and took another impression fully determined to succeed this time. I took the impression to Chicago to a specialist in prosthetic dentistry showing both impression and models. After consulting him and several others I returned home realizing that I had a lot to learn. Called my patient in, examined his mouth and found a very flabby ridge. First I took a modeling compound impression as of old, worked it loose so to fall down,

Took it out, hardened it, then scraped the inside a little where the flabby gums were turned up by pressure in taking. Again inserted in the mouth very carefully and poured very thin plaster into the impression while in the mouth, letting plaster set with the tissues in normal position. Then secured model, set the teeth up on an anatomical articulator using every principle and the methods prescribed in the teaching of those that had given this subject study. I also let my patient see step by step just what I was doing, he appreciated it and paid me one hundred dollars.

MORAL. Do not practice dentistry like the young fellow who extracted two anterior teeth instead of the posterior ones which were aching because they were handier to get at, but read dental journals, attend dental societies, and learn from those that know.

OPERATIVE AND POST OPERATIVE TREATMENT FOR THE REMOVAL OF IMPACTED THIRD MOLARS.

BY M. N. FEDERSPIEL, B. SC., D. D. S., M. D. MILWAUKEE, WIS.

Several years ago the writer contributed a paper entitled "Trismus Dentum," published in the *Milwaukee Medical Journal*. It was his desire at that time to call attention to the many cases wherein patients manifest much suffering and annoyance from impacted third molars, which frequently are given little or no consideration as etiological factors in producing peritonsillar abscesses, osteomyelitis, jaw trismus, etc.; which oftentimes produce considerable systemic disturbances.

During the last ten years the writer has had the opportunity to give such cases much study and consideration in his clinic at Marquette University and in private practice.

Third molars usually erupt at about the eighteenth year. Their appearance ordinarily gives rise to little or no disturbance provided the development of the jaws is normal and the path of eruption is not obstructed. This is not always the case, as the records show that many patients between the age of seventeen and forty-five years give symptoms peculiar to maleruption of

third molars depending of course on the degree of the deflection and the infection surrounding the tooth within the jaw bone.

The lower jaw is far more susceptible to this disturbance than the upper. This can be explained by observing the anatomy of the lower jaw. The development of the lower jaw should be in proportion to the normal eruption of the teeth, so when all of the teeth have erupted the process of the jaw development should be complete. Unfortunately this is not always the case; clinical evidences prove that the third molars are frequently delayed in their eruption. This is usually due to the lack of room between the second molar and the terminal point of the alveolar line behind. This lack of space deflects the tooth from the normal path of eruption or it may develop below the alveolar margin. This malposition of the third molar may remain quiescent for a number of years and then give rise to much annoyance and inflammation. This is as a rule brought about by infection which is permitted to creep below the lower gum tissue which lies over the partly erupted tooth setting up a severe pericementitis then involving the surrounding tissues about the ascending ramus, and extending from there to the fauces. This pathological phenomena gives rapid rise to a number of symptoms which are almost pathognomonic of an impacted third molar. Deglutition becomes painful, movements of the jaw are limited and frequently it becomes set, rapid rise of temperature, fetid breath, and swelling of the area adjoining the tooth. This morbid process if untreated will give rise to continuous pain for a number of days; the pus burrowing along the lines of least resistance until it breaks out. In other cases it may involve the tonsil and produce a peritonsillar abscess, or it may work down into the cancellous structure of the bone developing osteomyelitis with considerable destruction of the bone tissue. While it is true the prognosis in the average case is very favorable, my records and those of a number of oral surgeons prove that in many of these cases serious disturbances have come from either faulty treatment or neglect of the patient to seek relief at a time when treatment would have saved them from much suffering and annoyance.

Lack of space no doubt is a factor in preventing normal eruption. The extreme malposition that the tooth frequently

takes is largely due to the pressing of the tooth in the line of least resistance. In the majority of cases I have observed that the tooth soon loses the vertical position and then grows either forwards, outwards, inwards or backwards. In the lower jaw the forward tilting position is by far the more common; the degree varying from a slightly oblique to a horizontal direction. Of course there are many cases where the tooth may occupy most any position from a slight tilting to a completely imbedded position with the crown pointing backwards and downwards.

TREATMENT:

The treatment of impacted molars is surgical; by that I mean, that the removal of these impacted teeth within the jaw bone should not be subjected to forcible extraction with forceps and elevators thereby producing much tearing and laceration of the surrounding tissues, with further infection; but to remove the offending tooth along purely surgical lines thereby giving the patient immediate relief and warranting rapid healing.

I will never forget witnessing a clinic where the operator attempted the removal of a badly impacted third molar under nitrous-oxid-oxygen anesthesia in an assembly hall. The patient, a young lady, was subjected to the most cruel torture for almost one hour. The dentist jerked, pulled, dug and tore; at times the patient was cyanosed to the color of blue litmus paper, at other times fully awakened to the horror of her position; her screams of pain and fright the dentist disregarded. The dentist's ignorance pertaining to the principles of surgery almost sickened me. Finally he removed a greater part of the tooth after stripping the soft tissues almost to the anterior pillar; the patient was given a sample bottle of mouth wash, as a guarantee cure for soft and flabby gums and then advised to go home.

This was a surgical clinic where advertising antiseptic mouth washes and nitrous oxid machines helped to make the meeting a success.

Removing the second molar to make room for the third molar is often done; this will frequently relieve the patient of further disturbances. This procedure I unhesitatingly condemn as the second molar is an important organ in mastication and should be preserved. The removal of an impacted third molar

should not be undertaken with forceps as such methods are violations of surgical principles and permit of much trauma and oft-times are the beginning of serious infection, with its disastrous consequences. I will attempt to briefly describe my method of removing impacted third molars.

The patient is advised that in order to obtain a favorable prognosis, it is necessary to report at the hospital to be prepared for a general anesthetic. After the patient is fully anesthetized the mouth is carefully opened and the oral cavity packed with gauze in such a way as to crowd the tongue away from the field of operation and held so with a retractor. The anesthetic in the meanwhile is given through the nose, through a soft rubber tube attached to the ether bottle spray. An incision of about one and one-half inches long is made parallel to the jaw in the alveolar cul de sac, one-fourth inch from the alveolar margin; the entire mucoperiosteal flap is freed from its attachment leaving the bone covering the tooth on the buccal side bare. Hemorrhage is stopped by the means of hot packs and then with a surgical drill the outer bone plate is removed. This will give free vision of the tooth.

Then by means of an elevator the tooth is gently rolled out of its position; the flap is then replaced in its former position and the bone socket packed with a gauze to be removed forty-eight hours later. After that the wound is irrigated with warm sterile water and left to heal.

It is surprising how rapidly the wound heals and what little discomfort the patient is put to in comparison with the crude method of forcibly extracting with powerful forceps. My reason for writing upon this subject is to call attention to the sequence of the many cases that enter my clinic and private practice after having impacted third molars forcibly torn out of the socket by means of forceps.

Let me call your attention to a Mrs. B., age 42. She consulted an extracting specialist in regard to an impacted third molar that had given her much trouble. The operator advised its removal at once. The patient was anesthetized with nitrous oxid and then with brute force the operator attempted to extract the tooth, which was impacted in such a way as to make it a physical impossibility to remove it without either breaking the

tooth or the jaw. After several attempts he broke away a part of the crown and sent the patient home with a promise that nature would in time expel the remains of the tooth from the socket. The following twenty-four hours she suffered excruciating pain, and on the third day she found it very painful to move the jaw. Her physician was consulted and he referred her to me.

Examination:

Jaw swollen and shifted to one side, breath very foul, swollen tonsil, tissue around the third molar badly lacerated and infected. She complained of fierce darting pains in the temporomandibular joint and swallowing painful and difficult.

X-Ray diagnosis:

Fracture of the jaw bone back of the third molar, most of the tooth still in the socket, lacerations and stretching of the joint ligaments.

The writer could cite many cases that through faulty technique and lack of appreciation of the principles of surgery have caused much damage in the attempt to forcibly extract an impacted third molar.

NOTES FROM THE SURGICAL CLINIC OF DR.
TRUMAN W. BROPHY.

REPORTED BY EARLE H. THOMAS, D. D. S., SUPERVISOR OF CLINIC.

Case 50. Mr. N. L., Age 29: Presented complaining of severe pain and a sense of fullness which had been present for two weeks over the area of the left antrum. Examination showed the mouth to be in a filthy condition and containing many badly decayed roots, one of which had abscessed into the antral cavity. This root was extracted and a small opening made into the antrum through the socket, and the antrum irrigated thoroughly with normal saline solution. Subsequently all decayed roots were extracted, the mouth put in a cleanly condition, and the antrum irrigated every day. In about ten days all the symptoms had disappeared and the opening had healed over completely. A curettement was not indicated here because of the case being an acute one and therefore the membrane lining the antrum was

still intact, and there would be no object to be gained by its removal. In chronic cases however the membrane has to a great extent been destroyed and changed into pus, and the cavity has always become filled with polypi; hence the object of the curette-ment is principally to remove the polypi. Any operation which does not fully remove all polypi from the antral cavity cannot result in a cure and this is one reason that operating through the canine fossa is preferable to other modes, because in this way there can be obtained easy access with a curette to all parts of the antrum, and besides ocular examination by the use of a small incandescent light can be made. Destruction of the naso-antral wall as is often practiced leaves the patient not only in an abnormal, but a decidedly uncomfortable condition, through life. The opening through the canine fossa also makes it possible to dilate the ostium maxillarae when necessary, thus establishing a normal communication between the nose and the antrum.

Case 71. Mr. M. F., Age 35: Presented with the mandible fractured at the symphysis and at a point just anterior to the angle on the right side. The teeth were first thoroughly cleaned, and then those of the lower jaw were wired to those of the upper jaw in perfect occlusion, the wires being placed at five different places. Two weeks later, the patient being about to leave the city, the wires were removed and examination showed that both fractures were apparently healed, but just lingually to the posterior fracture was a painful fluctuating swelling. This was incised evacuating a small quantity of pus. Two months later the patient returned to the city and reported at the clinic with a sinus still present at the point of incision of the abscess, the whole area being hypersensitive. A thorough exploration revealed the presence of a sharp loose spicule of bone which was removed and the cavity irrigated with normal saline solution. In a few days the whole area had nicely healed. This is a condition frequently met with in fractures and also in difficult extractions where large pieces of process are broken loose and yet left buried in the tissues. If watched for and taken care of early the patient is saved from much unnecessary pain and inconvenience and the operator therefore benefits accordingly. It was somewhat of a risk to remove the wires in two weeks but the exigencies of the case made it necessary. The wires should have remained at least

five or six weeks. Fortunately however union was prompt when immobilization was secured and the parts did well.

Case 37. Master L. S., Age 6: Presented complaining of constant pain and intermittent bleeding over the area of the left upper cuspid. The history was given of a badly decayed temporary cuspid having been extracted six months previously, and



Case 95.

an examination showed a chronic ulcerous condition of the tissue with necrosis of a small area of the underlying bone. The tissue was incised, retracted, the area of necrosis was curetted away and the cavity packed with iodoform gauze. This was

changed and the cavity irrigated every day during the first week, and every second day during the second week at the end of which time the parts were nicely healed. This goes to illustrate that when a tooth is abscessed to the extent that it is complicated by bone involvement around the end of the root, extracting the tooth is not sufficient to end the trouble—all diseased bone must be removed also before the parts will heal.

Case 95. Miss F. R., Age 22: Presented with a painless growth just inside the left angle of the mouth resembling a lima bean in size and shape, and attached by a short thick pedicle. It had been present as long as the patient could remember and was causing her much inconvenience. It was diagnosed as a papilloma. The part was sprayed with ethyl chlorid, the pedicle was dissected out and the wound closed by two horse-hair sutures. These were removed seven days later at which time the parts had nicely healed. The patient was greatly pleased with the result especially since it had been accomplished with so little inconvenience to her.

Case 91. Miss C. L., Age 27: Patient presented with the history of the upper right third molar having been extracted thirteen months ago exposing the antrum which evidently became infected. Shortly after this there started pain and a discharge from the nose on the right side, which was very profuse upon arising in the morning after having slept with that side down. This finally became so troublesome that she consulted a physician who irrigated the antrum through the nose. The pain gradually became worse and she was referred to the clinic. Four months ago she was operated on through the canine fossa and the whole antrum curetted, it being literally packed full of polypi. The opening through the canine fossa was made large enough to insert the finger and feel that the antrum was thoroughly cleaned out. It was then packed with iodoform gauze which after forty-eight hours was changed and the antrum irrigated with weak boric acid solution. This was repeated every day for one week at which time the gauze was discontinued and a gutta percha plug made to maintain the opening. This plug was removed by the patient and the antrum irrigated with weak boric acid solution every other day. After three weeks of this treatment there were still traces of pus in the washings, and so

the solution was changed to a weak iodine solution—five or six minims of tincture of iodine to a glass of warm water. One week later the washings were clear, there was no more pain, and the patient expressed herself as feeling much better than she had for a long time. The use of the plug was continued for one month after the washings became clear, the object of which was to enable us to determine whether there was likely to be a recurrence of the infection. The disease however did not recur. The plug then was reduced in size from time to time until the opening closed.

Case 34. Mrs. D. L., Age 21: While having the upper left lateral recrowned, she began to suffer severe pain referred to the upper left cuspid. This continued for nearly one week when an abscess pointed in the palate and was incised relieving her of the pain. An X-Ray showed the abscess to come from the lateral although its root-canal was filled perfectly. The root filling was not tampered with and the only treatment instituted was keeping the sinus open with gauze and keeping the tract irrigated with normal saline solution, and under this routine the parts healed completely in three weeks. At the time of insertion of the root-canal filling, no doubt some attenuated bacteria were carried to the apical area, where they remained latent until irritated by the recrowning of the tooth, when they suddenly became active thereby causing the abscess to form. Evacuation of the pus gave nature a chance to heal the condition which she did very nicely. In this connection it might be mentioned that probably a majority of all abscesses pointing in the anterior part of the palate come from either of the lateral incisor teeth, and keeping this in mind often saves considerable delay in locating the cause of such trouble.

Case 105. Mr. F. D., Age 30: Presented to the clinic complaining very much of difficulty in breathing through the nose, and realizing that his mouth was not of normal shape he came to the clinic to see if anything could be done for him. Examination revealed a very much contracted upper arch with a very high palate. Of course, he was told that nothing in the line of oral surgery could benefit him, but the case only goes to show that such cases should be watched for and prevented in the early stages and not left until they become a permanent disability when

they are regretted both by the person concerned, and also by every conscientious dentist who sees such a case. Our slogan of "Prevention is better than cure," should certainly include cases of this kind as being of greatest importance because of their baneful influence upon the health of the individual.

PACKING THE ANTRUM OF HIGHMORE.

Preferably an iodoform gauze strip one and one-half inches wide is used, and a cardinal principle never to be overlooked is to put only one piece of gauze in. If the strips at your disposal are not long enough, tie two of them together—anyway to have it all in one piece. This is to avoid leaving a piece of gauze in the antrum, which would surely be followed by disastrous results in a short time. One end of the strip is grasped with long tissue forceps and carried to the most distant part of the antrum. The strip is then built up back and forward in layers with not too great pressure, until the antrum is full; then the strip is cut off, not right at the opening, but leaving about three inches of gauze projecting. The end of this is then turned over on itself and tucked into the antrum to avoid any loose strands hanging in the mouth, and the remaining excess gauze is packed tightly against the opening to keep it as large as possible so that the future packing and irrigating will be more easily carried out. The hardest thing to do in this kind of work is not to try to get the opening to close, but to keep it open.

CONSTRUCTION OF A GUTTA PERCHA PLUG.

The purpose of this plug is to maintain the opening through the canine fossa into the antrum. A piece of gauze about two inches by four inches is tied around its center by a string and is then inserted lengthwise into the antrum; when past the opening it is spread out and pulled back tight against the opening by means of the string. The cheek is kept retracted, a large piece of gutta percha or temporary stopping is made quite plastic and pressed into the opening. The gauze held by the string creates a counter pressure and also makes the plastic gutta percha spread out slightly at the inside of the opening, which shape is a mechanical aid in the retention of the plug. The cheek is then allowed to fall over the plug and pressure from the outside will mould the oral aspect of the plug to a comfortable shape; it is then trimmed

so as not to make the cheek bulge enough to be noticed. If this procedure is too painful for the patient to stand, the same result can be accomplished by using yellow beeswax to get a model of the required shape and then by means of dies and counter-dies, reproducing this model in gutta percha, or the model can also be reproduced in vulcanite. The idea is to use something that will not absorb the secretions of the mouth. If for any reason the plug is not self-retaining, it can be held in place very efficiently by means of a lug soldered to an orthodontia band cemented on the second bicuspid.

PROCEEDINGS OF SOCIETIES.

AMERICAN DENTAL SOCIETY OF EUROPE.

FORTY-FIRST ANNUAL MEETING, HELD AT PARIS, FRANCE, JULY 30-
AUGUST 1, 1914.

DISCUSSION OF THE PAPER BY DR. C. F. BÖDECKER ON "ENAMEL, CARIES
AND IMMUNITY."

DR. PRINZ:

Said the point that had specially interested him was the possibility of an interchange of nutrition in enamel. There existed two opposing views in the minds of histologists. One German school had said that formed enamel was dead tissue, while an opposing school was of the opinion that it was living tissue, like any other tissue in the body, provided that the pulp of the tooth was living. Up to the present it had been very difficult indeed to prove the statement, and as a consequence one school still persisted in saying that formed enamel was dead tissue. It had been shown by Dr. Bödecker that enamel possessed some sort of circulation, though minute. That proof, however, had been only obtained in slides, and consequently could be doubted simply because of the fact that for that kind of slide an extremely high power was necessary, and when a photograph was taken of 2,000 or more diameters, certain shadows occurred which might be interpreted by different men according to different views. One man might see things that others were unable to see. It was only within the last three years that he had succeeded in proving, by biological means, that there was a sort of circulation in the enamel; he had been successful in showing that material placed outside of a tooth could penetrate through the enamel and the dentin into the pulp. The discovery was rather accidental and he had not yet published it. Taking a tooth in which the pulp was normally active and cleansing the tooth by means of chloroform or alcohol, and placing upon it an extremely small quantity of arsenious acid, capping the tooth with a perfectly fitting cap, four to six days later, when testing the tooth with the electric current, it would be found that the arsenious acid had penetrated through the sound enamel and the dentin and had killed the pulp. If the same experiment was carried out with some powerful staining

material, such as methylene blue, the methylene blue would be carried along the lines of circulation along the fibres in the dentin and certain spaces which existed in the enamel. Unfortunately, staining material of that kind bleached out, and specimens became deteriorated in time. The biological fact being proved, it would naturally follow that, as Dr. Bödecker had said, interference with the circulation or with metabolism must occur. The subject was so new that it was impossible to make any statement, but there was a basis on which to work. In due time he hoped to be able to present the matter in print. Possibly Dr. Bödecker might throw some light on the fact that the ductless glands had some connection with the calcification of the tooth or resistance or non-resistance with regard to immunity from decay. At first he had laid comparatively little value on the existence of circulation, but since discovering it he had come to believe that possibly it would be a point of great importance in regard to daily procedure in preserving tooth structure or in bringing about a state of immunity.

DR. GRIEVES (Baltimore):

Said in America some men had found the subject a most seductive study and matters had advanced so that his paper read last May was already subject to revision and change. All the internal organs, some of which were not in a sense glands, were in cycle, and as yet it was impossible to put the finger on any particular gland as controlling metabolism. There was no doubt in his mind that there was a control by the entire cycle of calcium metabolism, as shown in cretinism and myxedema. The most interesting thing to dentists and orthodontists was that the cycle controlled not only the calcium metabolism, but the great connective tissue group. It had been shown by the essayist that in myxedema, where there was no growth of connective tissue, there was a shortening of bone and a failure to fill in and calcify, so that the matter was serious in its bearing on orthodontic conditions. Speaking directly to the subject of the calcification of the enamel, he believed it accounted for the fact that caries was symmetrical. For instance, in the buccal group of molars no local theory of caries would ever account for the symmetry of its etiology. Where enamel failed to develop, then caries might occur. There was also the feature of sugar metabolism. Dr. Kirk had shown with regard to the pituitary, and others had shown with regard to the whole group, that several of the glands

had control of sugar metabolism. When there was an increased tolerance of sugar it existed as such in the blood, as was shown by diabetes. Everyone knew the danger of operating in certain forms of diabetes, because the carbohydrate percentage in the blood formed a medium for the growth of organisms. Carbohydrate, if existing in an over-percentage in the blood, had to be discharged, but it was not yet proved that carbohydrate as such was thrown out in saliva. It had been his experience in practice that a patient with enamel hyperplasia was not necessarily carious.

DR. C. F. BÖDECKER:

In reply, said he was highly honored by the leading men in the profession having discussed his paper and by the reception of the paper by the press. Dr. Prinz's work was very valuable in showing that there was nutrition in the enamel. Both Dr. Prinz and himself were working at the same thing from two different directions. What Dr. Grieves had said about the glands being in cycle was true. When one gland was in a pathological condition the other gland would take up its function to a certain extent. On the other hand, sometimes a pathological condition of the one gland would disturb the entire system.

DISCUSSION OF THE PAPER BY DR. STURRIDGE ON "A FEW POINTS ON THE TREATMENT OF PYORRHEA ALVEOLARIS."

DR. W. DUNN (Florence):

Said that having dabbled a little in electricity of different kinds he was able to say that Dr. Sturridge was developing treatment on modern lines by the use of ions. He should like Dr. Sturridge to be kind enough to explain to him simply the technique in the application of ionic medication and to say whether he was right in believing that the electric current of a very low intensity split up the drugs into component ions. The specimens which Dr. Sturridge had shown proved very conclusively that in no other way could the salts be carried into the tissues so well as by the ionic method. He understood that drugs differed in the direction in which they flowed in the current. The very interesting book Dr. Sturridge had written on *Electro-dental Therapeutics* was a practical treatise on electricity in relation to dental work.

DR. H. G. FISHER (Cologne):

Said that while incompetent to discuss the paper, he felt he

ought to say a few words, as he had been using the machine for the last four or five months. Sufficient time had not yet elapsed to judge the results, but slides plainly showed that the medicament was driven into the tissue.

DR. KIRK DAVENPORT:

Said he had had the pleasure of watching Dr. Sturridge's results for some years and had had one of the instruments and was quite able to confirm the fact that very beneficial results were to be obtained. The instruments as now made were comparatively simple. His own instrument was connected straight to the street current, lamps being used for resistance, and he had had no trouble with it. It certainly seemed that the pockets yielded very much more rapidly to ionic treatment than to ordinary medication. With chlorid of zinc the healing effect was a great deal more rapid than where the same drug was used without the electric current. His wife had had a chronic inflammatory condition of the biscuspid tooth, the membrane about the tooth was inflamed and the dentin became very sensitive. The ordinary treatment with sulphate of copper seemed to have no effect and he finally treated her for five minutes with chlorid of zinc, using $2\frac{1}{2}$ milliamperes of current. The result was remarkable. The inflammatory condition of the gum disappeared in a day or two and the extreme sensitiveness had not recurred. Dr. Sturridge's book was a great addition to the literature of electro-therapeutics.

DR. PRINZ:

Said he read the paper some time ago in Berlin and had been asked by Dr. Sturridge to say a few words on what was meant by ionisation. Ionisation meant the solution of an inorganic or organic compound in a solvent by means of which decomposition of that compound into its ions or electrons would take place. To make it more clear one might recall to mind a compound like mercury bichlorid, which when dissolved in water set up a process of electrolysis, which meant that the negative and positive ions, respectively, were separated, the ions having a tendency to collect at the respective positive or negative pole of the battery, and could be passed to an intermediate film which might be parchment or other membrane. Ionisation was by no means new. It was stated as long ago as 1832 that potassium iodid could be driven into the entire body by the electric current and later on the principle

was revived under the name of cataphoresis; and in Berlin it had been used for the purpose of treating putrescent root canals. The method was adopted of using a zinc electrode, and by means of an electric current causing a decomposition of the zinc in the form of zinc chlorid, and later on it was taken up by many workers who all reported most excellent results. Ionic medication could be done most perfectly, the only difficulty being the cumbersome apparatus. There was no question at all about the extreme usefulness of such medication.

DR. STURRIDGE:

In reply, said one of the reasons why he had gone to the trouble of writing a book on electro-therapeutics was because there was an apparent lack of technique, and he found he had been for years making all sorts of mistakes because he had nothing to guide him. He therefore collected from medical works a number of facts appertaining to the subject, summarized them, and placed them in a book which he thought would require a good deal of revision. The great point was to know what drugs moved from the positive pole towards the negative. All the metals moved from the positive towards the negative, but iodine moved in an opposite direction, so that when using iodide of potassium potassium ions would be obtained and iodine would have no effect. That had been referred to years ago by Dr. Morton of New York, and had been proved in later years by Prof. Le Duc and others. He had only read the paper to emphasize one point, namely, the penetration of the ions and the effect they had on the bacteria that had gone beneath the surface of the tissues. He was convinced that the bacteria so far penetrated into the tissues that ordinary antiseptics applied by osmotic methods only affected the surfaces, and that in order to stop the inflammatory state of the disease it was necessary to destroy the bacteria which had got into the tissues and even into the bone itself. He was very pleased to have Dr. Prinz verify what he had said in the paper of the method of treatment. Dr. Davenport had seen cases recently that had been treated years ago and knew the practical value of the method. The point of sensitive dentin was one of the strongest features in the treatment. Sometimes a case was found where every tooth in the mouth was sensitive to the scalers, and it was almost hopeless to use a current. In such cases it was better to commence with about 1 milliamperes of cur-

rent and after seeing the case once or twice a year it would be found that later on it was possible to use 5 milliamperes on the same spot. Zinc ions were driven into the fine canaliculae of the sensitive dentin and completely stopped all sensation and the nasty feeling of heat and cold disappeared and the patients were very glad to come back for treatment.

ODONTOLOGICAL SOCIETY OF CHICAGO.

A regular meeting was held December 8, 1914, with the President, DR. E. A. ROYCE, in the Chair.

Dr. J. G. Reid, read a paper entitled "Mystery of Pain and Its Deception in Diagnosis."

In connection with the reading of the paper, Dr. Reid reported the following cases:

CASE I. The first case I want to relate is that of a young girl who came to my office at the age of about fifteen. This was her first visit to a dental office. She wanted her teeth examined and put in order. I examined her teeth and found twenty-eight of them in the mouth, all normally located, in splendid position, and beautiful teeth. At first glance, one would say that her teeth were entirely free from caries. After examining them carefully I found there were three or four fissures in different parts of the teeth which I thought ought to be filled at that time, although, in all probability they might not have needed filling for several years. However, at the time it seemed to me the proper thing. They were filled. I had charge of the mouth of that patient twice a year for about six years. There was no work done in her mouth from that time to this period of life. One day she came into my office with her face enshrouded in her hand and said, "Doctor, I am suffering intense pain" in a locality that she indicated, which was in the vicinity of the first and second bicuspids of the lower jaw, left side. I examined her teeth for her satisfaction and was unable to discover why she should have pain in that locality. I said: "There is nothing the matter with those teeth." She had beautiful teeth. Her mouth was healthy in every particular, and I dismissed her with the admonition to call me up later about it. She went home, and I heard nothing from her for quite a little while, when she returned again with pain in the same locality and was suffering apparently

very intensely. She insisted that there must be something wrong in that vicinity. To convince myself I made another examination, and I still could not see any reason for pain in that locality. I dismissed her again with the same instructions. I made no recommendations as to treatment, and I heard nothing from it. This occurred four different times at four different periods. At her fourth visit to my office when she presented the same condition, it dawned upon me that she came to my office about the same time every month, and I said to her, "You were in here about this time last month were you not?" She replied, "Yes." "Are you suffering from menstruation?" She answered that it was time for her menses to appear. I dismissed her and requested her to come back the next day with her mother and we would talk this matter over, which she did. I had a conversation with her mother and discovered she was afflicted with painful menstruation or dysmenorrhea, and this pain was coincident with the menstrual period. I also learned that these pains disappeared immediately upon the first appearance of the flow. I advised her to have some medical advice and attention which was done to correct the exciting cause.

I recite this case merely to show how much time is required in some instances to make a diagnosis or to discover the reason for certain pains. The pain in this instance was manifested in the region of the first and second bicuspsids, and yet there were no other local symptoms of any kind or character to warrant the appearance of pain in that locality. Constitutional treatment removed the trouble and there has been no evidence of the pain thereafter.

CASE II. The second case is of recent standing. The patient was a man, about fifty-five years of age, fine physique, semi-sedentary habits, with a fine set of teeth, particularly those he had in his mouth. There were only three or four missing teeth. He was an habitual user of aspirin. He used aspirin for anything that was the matter with him. I believe if a corn hurt him he would take a dose of aspirin for it. He called me up one day and said he had a severe pain in a tooth and would like to have me look at it. I told him to come to my office and I would make an examination. He located the pain in the second bicuspid of the lower jaw on the right side. I said to him, "Mr. M., there is nothing that I am able to discover from my examination as to why you should have pain in this tooth." It was a perfectly sound tooth; there was not the

slightest evidence of caries. The gums were healthy. There were no deposits of any kind in that neighborhood. Notwithstanding this, he said he had pain in that tooth, that he got up last night and took a dose of aspirin. He woke up the next morning, felt a little pain and then took another dose of aspirin for fear the pain might come on and become more severe. I examined him, dismissed him, and nothing further was said about it, and he did not call me up again in regard to the matter for about three weeks. A second visit was made and he said he had pain in the same locality, that it was bothering him very much and he must have it attended to. He still insisted it was in the second bicuspid. I tested the teeth in that vicinity with all the tests I knew for painful conditions about the teeth, and I got no response of any kind or character. He told me that he was not inconvenienced in eating or by any soreness, nor was he inconvenienced by changes of temperature. Anything that was cold or hot would elicit no response. These pains were periodical, and when they came on he suffered considerably for an hour or two.

I had filled his first molar some two years before this, and about one-third of the entire crown of this tooth was gone. It had ceased to decay after the crown had been broken down, and there was a hard, black, shiny, glossy surface of dentin. There had been no progression of decay for several years but I restored that tooth for the purposes of better mastication. I restored it with an amalgam filling as I found this could be done easily and it would be useful to him. It occurred to me from his visits that this pain might have come from this molar tooth, as I had to depend on pits for anchorage. I said to him, "I think you are mistaken about the pain in the bicuspid, and that if you have any pain it must be from the molar." "No," he said, "that molar is all right. There is no pain in it." To all intents and purposes, and by all tests I was able to command examination indicated the same; there was no difference between that and the bicuspid. I hammered them and thumped them and did all sorts of things, but there was no soreness and no response to the extremes of heat or cold. I still insisted it was the molar that was troubling him. I started to drill in through the amalgam filling. When I reached the dentin, I told him to let me know if it responded. I passed through the amalgam filling and had not gone more than one millimeter, if that much, when he said that it hurt. I stopped and said I could not believe that tooth was the troubling

member, and dismissed him. I did not hear from him for about three weeks, when he came in and said he wanted that tooth extracted, as it had bothered him so much. He still indicated the bicuspid. I told him I would put a rubber dam on the tooth and drill into it, and that when I got through the enamel he would know something about it. Transillumination showed no discoloration. I put a drill into it. I went on, and he sat there perfectly unconcerned and plunk it went into the pulp chamber. I blew the chips out of it. It was dry. I enlarged the opening, passed a fine broach into the pulp chamber, withdrew it, and out came a perfectly mummified pulp. It was as pretty a specimen of a mummified pulp as anyone could wish to look at. It was mummified completely to the minutest end of the pulp and not the slightest odor. He said, "That feels better." I dressed it, sealed it, and he went away. I told him to return in two or three days. He came back and said he was comfortable. I removed the dressing and satisfied myself that there was no odor so far as my olfactories were able to detect. I said, "I will fill the root of this tooth at once," which I did, and put in a filling within a few days. The operation was completed a year ago, this last October, and he has had no trouble since then.

The only thing about this case that is mysterious is, what caused the pain. I am not able to determine even now why that tooth pained him, and if there is anyone here who can enlighten me, I shall be glad to have him do so.

DISCUSSION OF DR. REID'S PAPER.

DR. J. E. HINKINS:

I have been very much interested in Dr. Reid's paper, and I wish to say that the dental practice of today in my own office is an entirely different proposition from what it was five years ago. I believe, and have believed for some time, that the dental profession is not properly educated. We get a lot of things in college that are good and a lot of things that are bad, and I believe today that when a patient presents himself to a dentist, that dentist should be qualified to make a good physical examination. He should be able to make a good subjective and objective examination, and if he cannot find the cause of the trouble, then he should resort to the use of the X-ray. There are a number of dentists who are capable of making as good a physical diagnosis as the best of our physicians. Let him take a blood smear and make a blood count of the white and

red cells, the polymorphonuclears, the percentages, and keep a record of them. Let him make a urinalysis to see if there is any albumin or sugar in the urine. If he cannot find the cause of the trouble then, let him call in a physician, the family physician, and consult with him. Until members of the dental profession are able to make such examinations and can show the medical profession that dentists are quite competent to make a good physical examination, we are going to be slurred by the medical profession as we have been slurred.

Last week a physician sent me a patient with the request that I remove eight of the back teeth. I examined the mouth carefully, removed the deposits from the lady's teeth, and she had twenty-eight teeth. She has been my patient twenty-nine years. I had an X-ray made by Dr. Potter and was unable to find any infection there. I sent her back to the physician, having positively declined to recommend the extraction of the eight back teeth. Again, he sent her back to my office, stating that he had made a physical examination, but there was a record on the history sheet that he had noted the systolic, but not the diastolic pressure. He did not give the percentage of the hemoglobin or polymorphonuclears nor did he give the percentage of the mononuclears, nor the percentage of the urine excreted, etc. I went over the teeth again very carefully, and wrote the physician that if he would examine the patient more thoroughly he would probably find out what was the matter with her. I told him that such a preliminary examination as he had made did not go with me, even though I am only a poor ignorant dentist, and signed my name to the letter. The doctor came to see me, and wanted these eight teeth extracted, on the ground that there was streptococcic infection. I asked him what evidence he had to show there was streptococcic infection, and he replied, "She has rheumatism." I said to him, "how do you know the extraction of those teeth will cure the rheumatism?" He replied, "There is infection there." I said, "Where is it? You have had no skiagraphs taken to show it, while I have consulted one of the best men in the city, an expert in X-ray work, and he says there is no infection there." Again, I said, "If there is streptococcic infection, would you make an autogenous vaccine?" He answered, "No." I asked him again what evidence he had to prove that the removal of these eight teeth would cure the rheumatism. He re-

plied, "It would remove the streptococcic infection." This woman has had rheumatism since the first time she consulted me. If those teeth were producing streptococcic infection, why would she not be crippled up by rheumatism ever since as a result of that infection? There is no infection there so far as I could determine. I tested the teeth with heat and cold and found they were healthy. I said to the doctor that I did not think the removal of those eight teeth would cure the infection, if it were present. As it is now, she has no trouble in masticating food. The doctor said he would drop the case, and would not have anything further to do with it. He did not make a thorough examination. As the woman had been to a pink tea party and had some colloidal substance about the teeth, he pressed it and it looked like a discharge of pus. It is true, the gums had receded some, but the teeth had been painted with nitrate of silver in years gone by. They were smooth and shiny. He became indignant and left the office. The woman still retains her eight teeth and she still has her rheumatic trouble.

DR. ELLIOTT R. CARPENTER:

I enjoyed this paper very much indeed, but there is very little I feel capable of offering in the way of enlightenment in regard to it. I am sorry I cannot take issue with the essayist. There was one thing he commented upon, and that is the stoic was often the means of misleading the diagnostician in coming to an intelligent conclusion. He also spoke of how the highly wrought nervous individual was the other extreme. I would hardly call the stoic extreme. I would call him abnormal in aborting the thing you desire by his peculiar ability to withhold any demonstration of pain. One thing he omitted in regard to the symptom of pain was the phlegmatic individual. The phlegmatic individual upon feeling pain will be more or less of a stoic because of the phlegmatism, but when any lesion has been corrected and there is a return to the normal condition, the phlegmatic person will recover from pain rapidly. That is the only point I would make.

DR. SILVERMAN, Atlanta, Georgia:

I have been very much interested in Dr. Reid's paper, and it is one along the line of the position take by Dr. Upson, who was on the Lakeside Hospital staff, and who recently died. Upson by his book entitled "Insomnia, Insanity and Nerve Strain Due to Dental Disorders," has helped dentistry of the higher type more than any-

thing in a long time. The Mayos, Osler, Wiley, and a few other celebrities in the medical world have given us a little lift occasionally by tracing infections to decayed teeth and to diseases of the mouth, but Upson went to work and took raving maniacs, those suffering from acute mania, from insane asylums and by simple operations upon the teeth brought about marvelous results. His book now is sold out, so that it is very difficult to get one. I think every dentist ought to try and get hold of a copy of that book and read it, as it will give him an idea and inspiration to look further into reflex pains.

Both Dr. Reid and Dr. Carpenter spoke of the stoic, and also of the person who is rather hypersensitive. The latter type I meet with quite frequently in my anesthesia work. I remember as a child seeing a fellow take a pin and stick himself all over, and everybody wondered why he could stand it. We need not pity the man who sticks pins in himself, because this particular individual has not got that sensitive nervous system that we have. He can do things that we cannot do, and do them with impunity, and can hide things from the diagnostician, and as a result of his general make-up he is incapable of perceiving or suffering from the pricks of pins.

DR. L. L. DAVIS:

I want to ask the essayist a question or two. First, I want to know how he treated the first patient and cured her so quickly. I do not think he mentioned calling in the family physician, but he said he talked over the matter with the patient's mother and cured the case, which was a rather strange method of procedure.

With regard to the second case, I am surprised that a man who knows so much about dentistry and practices up-to-date dentistry, when that patient came in and insisted on a number of occasions that the pain was located in certain teeth, he did not refer the case to an X-ray specialist for the purpose of getting an X-ray of the jaw on that side. That would have cleared up the case at once, because when he drilled into the cavity if he had not found odor he would have found evidences of pericementitis at the end of the root. It would have shown in the X-ray, or the chances are it would. Only within the last ten days a patient was referred to me by another dentist and I was unable to find anything wrong. Seemingly the teeth were in beautiful shape, inlays and all. The work in the mouth was very beautifully done, but the patient was in trouble. I

sent her to Dr. Molt and had him X-ray the upper and lower jaws on each side. I was not satisfied with the pictures he sent over and told Dr. Molt so. He went over the case again and we found out the trouble from the second lot of pictures. The trouble was located in a tooth that had a very beautiful gold inlay, and that gold inlay ran to the horn of the pulp and the pulp had died. It was all mummified.

That is the only criticism I have to make, namely, the essayist did not use the X-ray.

DR. TRUMAN W. BROPHY:

The essayist has presented some very interesting cases to you. There are two or three causes of pain out of the many which I might refer to that are of interest to everyone, not only to the laity but to the physician and dentist. People at large are of the opinion that if teeth cause extreme pain, it may be relieved by having the tooth or teeth extracted. Sometimes extraction does relieve pain, while at other times it does not.

When it comes to the question of artificial dentures, I think the average dentist seldom thinks of the amount of pain he may cause by a lack of judgment in adjusting them. I speak particularly of full dentures. I think everyone here is conscious of the fact that he has had in his own practice this experience. The edentulous patient will complain of the same kind of pain he had before his teeth were extracted. He wears artificial dentures. He feels comfortable when the dentures are out, but when he puts the denture in he has the same old toothache which he had before. Really, there is no mystery about these pains. It is like the mysterious neuralgias which existed prior to the advent of Roentgen photography. Patients were given quinin and morphia and everything under the sun to control pain, so much so that many patients acquired the morphin habit, due to the administration of morphin for the control of pain, but which pain had its origin from a specific source which was never discovered and so the physicians assumed the pain was caused by a general systemic disturbance. The pain which is complained of by the edentulous patient is due to the pressure of an ill-advised plate, which is constructed on an ill-advised plan. The dentist who makes a plate oftentimes forgets to take into consideration the anatomy of the part; he takes an impression, makes his cast and plate, and puts it in, and the patient

has so much pain that it is a sense of relief to take the plate out. The pain is due to pressure upon the terminal branches of the fifth nerve. If he makes a plate without considering the points of exit of these nerves, makes the same pressure upon these nerves that he does elsewhere, it would be just like making a saddle to put on a horse's back without considering the animal's spine. It would produce such an abrasion of the spine that the horse could not bear it. And so it is with a plate. A plate should be so constructed as to make little depressions in it to fit over the nerve termini like the saddle on a horse's back. When it comes to a lower denture, especially in the very aged, in whose cases the mental foramina are on the summit of the alveolar border, when you put your finger in the mouth of such a patient you can feel a distinct ridge that has a nerve that emerges from that point. The average dentist in making a denture does not consider the anatomical peculiarity of the fit, but when the denture is put in it creates such pressure that it causes pain. There is no mystery about such a pain. It is a lack of judgment or thoughtlessness on the part of the dentist.

I could recite many other cases, but I shall not do so at this time. I want to speak of the work of Dr. Upson in the interest of humanity. It was Dr. Upson, more than any other man in our country, who awakened interest in the subject of pain in the minds of the medical profession, following which such men as the Mayos, Murphy and many others took it up and gave it the attention that its importance demands. Why did Upson do this? There is always a reason for everything. Upson was inspired to do this by a member of our profession, a young man whom I presume you all know. It was John Stephan, of Cleveland, Ohio, who being a friend of Upson, suggested these conditions as factors in the cause of pain. Upson investigated and through the deep interest he took in the subject he evolved the most remarkable work of the kind that has ever appeared. He passed out of life just at the beginning of his greatest usefulness, but he has set the pace so that others may take up the work. Now every neurologist is considering the subject of dental pathology and the influence it has upon the system generally. I have often thought of what Atkinson used to say and what such men as Crawford used to say, as well as others, about the tremendous influence of diseases of the teeth over the body. While unfortunately this has never been considered

in its proper light and given the importance that it should receive in the curriculum of medicine, the time is about at hand when medical institutions will be compelled to teach the students dental pathology. It has been said that dentists do not know as much general pathology as they should, and that is largely true, but when men stand up and discuss the subject of pathology as it has been discussed this evening, I want to say that there are dentists who do know general pathology. I would not for one moment speak in a manner derogatory of the medical practitioner, because I believe the physician knows more than we do about many things, but I do know that the fault lies in schools of medicine. There was never a greater fallacy proclaimed than the definition of medicine. It is "The healing art in all its branches." Through the work of Upson the profession is awakening to the importance of the subject of dental pathology.

DR. REID (closing):

In answer to the criticism of Dr. Davis, when he says that a skiagraph would show a lesion in this locality, it would seem to me from my limited knowledge of skiagraphs that I would rather take diagnostic features in the form of soreness of the part than depend upon the diagnostic indication of a skiagraph. I have no recollection of any case where an inflamed pericementum would not respond to some local mechanical hammering. In case of inflammation of the peridental membrane the patient is bound to have trouble. I do not recall any case wherein soreness was absent if there was any peridental inflammation. It would be singular if it was. I do not see how a skiagraph would have shown the condition in that case at all. For Dr. Davis's further edification, I will acknowledge that I might have discovered the pulp was dead a little easier than I did by applying the electric current. It would have been a simpler way of determining the condition and it would have been far surer than the evidence which any skiagraph could offer. A skiagraph would not show a mummified pulp.

CHICAGO DENTAL SOCIETY.

The regular December meeting of the Chicago Dental Society was held Tuesday evening, Dec. 15, 1914, at 7:45, in the University Building.

The President of the Society, DR. T. L. GRISAMORE, occupied the chair.

Dr. W. E. Harper presented a paper on the subject of "Amalgam."

DISCUSSION.

DR. MARCUS L. WARD, Ann Arbor, Mich.:

Mr. President: The essayist has mentioned a number of things I am glad to coincide with. However, I cannot agree with everything. He started out by mentioning that from 60 to 90% of the profession would fail in packing the amalgam. I heartily agree with that. I think from the time of Dr. Black's investigations to the present time, anybody who has done any work along this line has found it necessary to emphasize the best technique in packing amalgam. I think anyone who has done any work along this line has had much to contend with. There is a constant demand for rapid setting stuff that can be thrown together in about a minute. He mentioned also the necessity for something besides large pluggers. He also said that 21 of 32 tests made at a recent meeting were failures. I think this is all right and true. He also mentioned that too much excess must not be left in the filling as it might interfere with bulk changes.

DR. HARPER:

It might interfere with the mixing.

DR. WARD:

Yes. He mentioned also that his process was to mix two minutes in the mortar and half a minute in the hand. He also stated that results were best when there was no crepitus. I have many times said that we should not use a sloppy mass. The essayist also emphasized the necessity of rapid mixing. I think that is a good thing. He concluded that the air test is about the only accurate means we have. I agree with that in the main. I think you can hardly say enough about the necessity for doing better work in packing. He does not distinguish between the two classes of alloys on the market: the slow-setting alloy and the rapid-setting alloy. I take it that he has been working very largely with the quick-setting alloy. Those who have worked both kinds of alloys will find that with the slow-setting alloy they can get the same plasticity. I can take a class of one hundred students and make a tight filling with the mass long after setting has begun. I took

my assistant, Dr. Cole, into the laboratory, and had him work Dr. Harper's alloy while I packed. I had him move just as fast as he could until it crumpled up like shot in his hand, and yet I had a filling that would stand twenty-five pounds air pressure.

The important part of the paper is that dealing with packing. I am just as confident as can be that those fillings that are packed by the average persons in a sloppy mass will have an excess of mercury. If they do have an excess of mercury, those undissolved filings will be acted upon by the excess of mercury. The fellow who has left an excess of mercury will have a filling that will be enlarged like a small ant hill in two or three years.

The point that I disagree with is this: That every single alloy that is on the market that is slow-setting can be made just as plastic as the alloys that set rapidly. Some cements are more hydraulic, but generally speaking, I do not believe they are as satisfactory as the slower setting article.

DR. E. D. COOLIDGE:

Mr. President: Dr. Harper remarked that perhaps 75% of the teeth are saved with amalgam. I do not doubt that 75% of the teeth are filled with amalgam, but I don't believe that many are saved. I do believe that they can be saved if the amalgam is properly manipulated. The average amalgam filling must be replaced in two or three years. This would not be necessary if the work were properly done. Personally, I do not favor amalgam because of the cheap way in which it is employed. If it is properly manipulated, it requires so much time that it makes a very dear filling for the dentist unless he is remunerated for the time spent in manipulating. I believe the whole matter is one of technique. The tests thrown on the screen show defects that are very common. We have seen them and know about them, and yet if we should examine the work that is done by the same men in their offices, we should no doubt find that it was hurriedly done.

In regard to the size of the plugger that is used, I do not perhaps quite get the meaning Dr. Harper meant to give. It seemed to me that he favored the medium-sized plugger. Personally I do not find that it makes a great deal of difference if I spend the time necessary to get adaptation to the wall of the cavity.

The one thing I find that seems to me to be of interest along this line is the making of dies for indirect inlay work. We have a

chance to examine the amalgam a little more closely. In packing I use a very small plugger as the angles must be filled with the alloy. The impression of the cavity is invested in plaster and the amalgam packed in that, and as it fills up a large plugger is used and it is burnished around the margins. When it is filled, I take a mallet and hit it two or three good cracks. That drives out the mercury and forces the amalgam down into the cavity. Dr. Harper recommended pressing it in with the thumb. I do not believe there are many cavities where that would be successful. If the cavity has four walls, it might be pressed in with the thumb, but I do not see the advantage of it. A filling that is pressed into the cavity, and does not adhere to the wall closely at the gingival margin is a very dangerous filling to leave.

The handling of amalgam seems to me to be a matter of time and attention to detail. Almost any amalgam on the market can be handled successfully if care is taken with it. The whole trouble is that the time is not taken to put the amalgam in properly. If amalgam is to stay with us, and of that there seems to be no doubt, it seems to me that it should be elevated and not looked down upon. I think we should give the necessary time to manipulate it properly and see that we are fairly recompensed for the time spent, otherwise, we shall never give it the time we should. We must consider whether we are losing money or are in the work entirely for the benefit of the patient. If we are going to succeed, we must make good fillings, and good fillings can be made with amalgam, but it takes time and attention to detail.

DR. L. H. ARNOLD:

Mr. President: Dr. Coolidge spoke about the recompense we are to receive, or should receive, for amalgam fillings. This is quite an important point because you cannot do anything well unless you are sure that you are going to get paid for it. In that connection, I want to say that one of the best of the old-timers, Dr. C. P. Pruyn, I have understood frequently received thirty-five dollars for an amalgam filling. I think if more of us got thirty-five dollars for an amalgam filling, we would do better work. In almost all of Dr. Harper's work, he makes a cavity of four walls. He always uses a matrix which would give a four-wall cavity in which his manipulation is readily handled.

I have read a great deal that Dr. Ward has written and I have

the utmost regard for his statements, but I have not been able to get the same results by his methods as by Dr. Harper's.

Since most of what I know about the manipulation of amalgam I have learned from Dr. Harper it will be readily understood that any discussion I may have to offer of anything he may write on the subject will be merely in the nature of commendation and hence one-sided.

The essayist mentioned the clinics Dr. Pruyn used to give in which the victim of confidence in his own amalgam work was given the chance to show the onlookers what execrable amalgam fillings he was making for his patients and I am free to confess to having made such an exhibition of myself and from that day on I have been much in favor of gold for a filling material.

But Dr. Pruyn's little glass tubes showed plainly that all fillings made of amalgam mixed as we were in the habit of mixing it at the time these clinics were given were faulty to a degree, so faulty that the defects were plainly visible to the naked eye through the glass walls of the tube matrix.

In the work Dr. Harper has done another form of matrix has been used which has one side so arranged that when the filling is completed the movable side may be removed and reveal what is to be seen.

In many cases it is plainly to be seen that the filling is defective and in those cases the "air test" promptly confirms the suspicion that the filling will leak. But many of these fillings will not show much wrong to the eye and yet when they are put under the air test they leak like sieves.

The pictures shown are certainly instructive and to those whose practices require the use of amalgam, should be an incentive to adopt the comprehensive and conclusive technique which the essayist promulgates.

The experimental results which the essayist shows he has been able to attain are duplicated in his cases in the mouth and I can witness that because some time ago I had occasion to remove one of them for causes other than the failure of the filling and cavity walls freer from decay and discoloration I have never seen and a harder filling to remove I never want to see. Many fillings one is called on to remove will cut with the bur like wood more than like metal and this I lay largely to packing the filling after the

crystallization has begun which must be the case in all fillings of considerable size when the amalgam is mixed and the excess of mercury squeezed out of the mass before insertion, since the mass, deprived of the surplus mercury, begins to set at once and therefore it allows no time for insertion. On the other hand with the essayist's technique we have a mass supersaturated with mercury, that will not begin to crystalize for some minutes, giving ample time to insert and compress and at the same time express the surplus mercury, whereupon the filling begins at once to set in that portion since the next portion added does not disturb the harder portion beneath it.

We have heard Dr. Harper this evening use the term "Crepitus" freely and as synonymous with the first stages of crystallization and this should be food for reflection for us; for how many of us ever insert amalgam that does not creak in the working of it? And Dr. Harper emphasizes the statement that when a filling emits the "cry" of tin, as that note is known among metallurgists, then the filling made will be invariably faulty because the mass at the stage of crystallization when the crepitus is emitted is too hard to successfully pack into a cavity and produce a filling that will not leak at an unreasonably low air pressure.

Dr. Harper says that all good dental alloys require a *slight* excess of mercury but to those of you who have not seen the doctor mix amalgam it would probably look as if he had a *large* excess for the mass when ready to insert is so soft that it barely retains its shape when rolled up and laid on the table. Anything much harder than that would soften too soon to allow time to pack thoroughly.

The capsules filled with the correctly weighed portions of alloy and mercury have proved time savers to me and a great help in securing uniformly proportioned mixtures. They are to be heartily recommended.

After thoroughly trying out the directions given for the selection of mortar and pestle for the combination of the ingredients I have found that they are much superior to the smaller and rougher instruments that I had previously used.

It is quite a surprise to one who has not timed himself to see how much less time he mixes the compound than he had thought he took. It will be imperative for one wishing to adopt the essayist's technique to actually time himself by the watch in each mixing for

it seems to be quite out of the question to guess at it anywhere near correctly, and the experiments which have been carried out by the essayist show conclusively that with sub-normal mixing the material changes shape in a marked degree.

Much stress has been laid on the *tests* for a perfect filling and that to the discredit of the micrometer and I can but agree with the conclusion reached—namely that it makes little difference whether the micrometer shows movement or not provided the filling is tight in the cavity.

Of course it is understood that the assumption has been made that no filling could be tight in the cavity if it had moved from the position in which it was originally packed but the fact that the air pressure instrument shows that such is not the case and that it is possible for a filling to change shape in the cavity and still be air tight would seem to be conclusive evidence that too much importance has been attached to micrometric movements in amalgam testing.

The amount of force used in packing fillings in the extremely plastic state recommended does not give a satisfactory resistance at first, to the man who has been in the habit of packing harder mixtures but as the work progresses the underlying portion becomes more resisting and the apparently futile use of force shows its usefulness. After becoming acquainted with this method of packing it will be found to be very rapid and the saving of time and improvement in results while seemingly incompatible are nevertheless actual facts.

I can confidently recommend to such of you as have not yet adopted the essayist's technique—for I presume there are some such—the careful study of this paper in detail when it is published for it contains all the essentials needed and few superfluities and if fully mastered cannot fail to improve the amalgam work of anyone who is still working the old way and therefore attaining only mediocre results and with much unnecessary labor.

DR. J. T. McCALLUM:

Mr. President: I have listened with a great deal of interest. I have given up the use of amalgam, and I think that by the time you have looked into the subject through the glasses I have used, you will begin to think very seriously of relegating amalgam fillings to the scrap heap. That may sound very radical at this time,

but it is our duty as dentists to do the very best we can and save the teeth as long as possible, and be as reasonable with our patients as possible. I maintain that a cement filling will be more satisfactory than the average amalgam filling. I have seen hundreds of amalgam fillings, some of them put in by our best men, and they have failed to preserve the teeth. They have failed for various reasons, either through faulty technique, faulty alloy, or faulty cavity preparation. The percentage of failures has been so great that as a conscientious man, I feel that I cannot do my patients justice and insert them. I voiced my sentiments one evening on the West Side, and one of my friends criticized me. He asked me what I would do. I said I would put in gold fillings. He said they wouldn't stand the pressure, but I said they would. If you can stand the pressure of doing the work right, they will stand the pressure of paying for it. I have found little difficulty in educating my patients to have gold fillings.

It has been ten years since I inserted an amalgam filling, and I hope it will be many more years before I will have to go back to it. Do unto your patient as you would have your patient do unto you. Would you like to have a filling put into your mouth that you knew would last only a short time? You can preserve the tooth for the time that it takes to dissolve out a cement filling; whereas, with amalgam, you do not know it is a failure until the decay has progressed so far that a portion of the tooth is broken. I know men who put in amalgam fillings, and do beautiful work. I have seen some of the work and admired it, and in talking with those men, they have told me it takes two or three sittings to insert a single filling. To do amalgam work that way you would have to get the same fee as for gold fillings. If you do good work you will have to charge a good fee for it. The sooner we as a profession take up this matter and educate the public as to the injustice that has been done, the sooner will we begin to reap the benefit that comes from being perfectly square with our patients.

DR. C. KABELL:

Mr. President: I have not heard of Dr. Harper's new method until today, but still I have used the method in making amalgam models for porcelain fillings and there it worked all right.

Some one objected that in pressing with the thumb, you do not get the mercury out. I think if pressing does not remove it

thoroughly it would be all right to ask the patient to bite hard on the thumb. (Laughter.)

Lastly I would like to ask Dr. Ward a question: Does Dr. Ward, know that boiling of amalgam softens it? I accidentally discovered it, when in separating the compound from an amalgam die, I forgot to watch the pot that stood on the fire and thereby boiled it for five minutes, and when then I fished it out, it was as soft as a boiled potato!

The same thing happens regardless of the time elapsed since the mixing. Boiling of two year old dies show the same softening and I think it is worth an investigation, to find out at what heat below 212° F. amalgam will begin to soften.

DR. HARPER (closing the discussion):

Mr. President: It was a pleasant surprise to me to have the discussion opened by our esteemed friend, Dr. Ward, as he is an authority I much respect.

I suspect that we are not so far apart as might be thought by some here. I recommend that the packing of the filling be done while the amalgam is extremely plastic, when the quick-setting alloys are used; while Dr. Ward recommends the use of a slower setting alloy, and the use of a slower setting alloy would make the amalgam more plastic during the packing. I urge that plasticity is essential to reasonably uniform results.

Results accomplished by an operator of Dr. Ward's experience in test work using amalgam from which the excess mercury had been removed during the final kneading, does not mean that the average practitioner can accomplish the same result with a reasonable degree of uniformity. I find it practically impossible to do so except in comparatively small cavities.

I have a number of test fillings made eighteen months ago by the technic described which do not leak at twenty pounds air pressure, and I am hopeful that further time will show no unfavorable change.

My observations lead me to believe that decided plasticity is absolutely essential when using any of the quick-setting alloys, a number of which are popular and in common use.

In the use of slow-setting alloys, this requirement need not be emphasized because such alloys remain plastic sufficiently long to be very thoroughly packed while in that condition. Commonly the

plasticity is very materially increased by the packing technic, irrespective of the fact that the excess mercury had been removed during the final kneading.

The test cavities that I use in my work are considerably larger than those used by Dr. Ward. I am unable to secure reasonably uniform results in adaptation unless I commence the packing while the mass is extremely plastic, as the cavity is reduced in size the extreme plasticity becomes less necessary.

In my own work, I remove practically as much mercury during the packing as can be removed during the final kneading, leaving the filling equally resistant to crushing stress and flow.

The pictures shown tonight are of fillings made with the different popular alloys: slow, medium, and quick-setting; and the results shown are due almost entirely to faulty manipulation.

I am convinced that the procedure I present is essential if you desire to use one of the quick-setting alloys and at the same time secure the most uniform results in adaptation.

I did not mention in my paper that amalgam must be confined during the packing, making the use of a well-fitting matrix imperative, if any of the surrounding walls are missing. Many failures occur as a result of neglect to properly fit the matrix at the gingival, at which point special attention is required. I generally insert a wooden toothpick from the lingual, to wedge and hold the matrix firmly at this point.

In the Mid-West and West there are a large number of operators who prefer, for reasons of their own, to use the quick-setting alloys and to these the directions presented are particularly important.

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EDITORIAL.

THE THINNING RANKS OF THE PIONEERS.

Each year carries off some of the old time stalwarts of the profession leaving the gaps to be filled by younger men. As we look back over the last few years we are impressed with the large number of men who have passed away—men most prominent in the profession a decade ago. Taken at random as they occur to us, and making no pretence of including a tenth of them, we recall at least half a score who were men of outstanding interest in their day, but who are now numbered with the departed.

There was Norman W. Kingsley, the versatile genius, who was as great a writer as he was a dentist, and who was a greater artist than either. His excursions into sculpture brought to dentistry a recognition from the outside world which it had not before enjoyed, and he did more to stimulate an atmosphere of art in our calling than any man of his day and generation. In dental societies he was a brilliant speaker, and he left an impression on the profession not soon to be forgotten. Of W. D. Miller what shall be said? Little that has not already been said much better than we can say it. Suffice it to note that Miller's name is more frequently used in our scientific literature today than that of any man of the past, and he is looked upon as an authority on any subject which he investigated. His untimely death was a loss to the profession more serious than that incurred in the passing of any man of modern times. This because of the fact that he had plans laid to inaugurate a line of scientific work which was to

supplement and crown his previous splendid achievements. It is fitting that Miller's name is being commemorated so signally by the profession. Linked closely with the name of Miller, both in tastes and personal friendship, was that of W. C. Barrett, the intellectual giant whose brain encompassed more than the field of dentistry, and whose brilliant pen was constantly wielded for the uplift of the profession, and the cultivation of general literature, music and art. Barrett was a widely read man and a power for good not only in the councils of the profession and as an organizer and teacher in dental colleges, but also as an editor of dental journals. It was in his journal *The Independent Practitioner* that Miller's famous articles on the etiology of dental caries first appeared.

The contingent from the South contained the names of many brilliant men, notably McKellops of St. Louis, the finished operator; Morgan, the elder, of Nashville—a man of rare and sterling character; Crawford, the impassioned orator; Turner of Raleigh, father of our own C. R. Turner, and a man of cultivated tastes and Southern charm.

Then there was Bonwill the inventive genius whose active brain encompassed more of the problems of our profession than most men realized in his lifetime, and who left as a legacy many real advances of benefit to human kind. Litch the editor and author was a man quiet in his demeanor, but scholarly, deep, and profound, and he did a real service in giving a status to the dental thought of his day. Then comes the best beloved of all, the sweet, the serene, the charitable, the charming S. G. Perry. Never in our ranks was there a more pleasing personality than his, and he left wherever he went a precious savor of geniality and comradery. Perry's name is always spoken with loving kindness because of the memory of many gracious acts and much good cheer which he spread abundantly while living. A. W. Harlan was another man who a decade ago was most active in the profession. He was a man of rare mental capacity with an astonishing grasp of matters professional, and a most retentive memory for facts and figures. To him dental journalism in the middle West owes much, from the fact that he established and piloted to success the DENTAL REVIEW, which under his guiding hand attained to a prominent position in our periodical literature.

A score of men might be mentioned in this section, among them Cushing, Allport, and Dean; but coming down to more recent times we have Crouse, the man who labored harder and longer for the protection of the profession's rights than any man before or since, and whose work will be appreciated more as time goes on.

The recent deaths in the profession include the names of James Truman, a commanding figure in dentistry for nearly half a century; C. R. Butler, a rare and modest gentleman, and distinguished operator; and Louis Jack, a prolific and polished writer, and a practitioner of distinction and renown.

These men are gone, and others of their kind. The question is how are the ranks being filled? It would be pessimism to admit that they are not being well filled. The profession must go on and good men must be developed to take the places of those who have passed. But the debt to the pioneers must never be forgotten, and it is well to hark back at times and view with due appreciation what the fathers have done for us. We fear that the younger men of the profession do not sufficiently realize their indebtedness to the men who have gone before. As the distinguished editor of the *Dental Cosmos* has remarked in an editorial on a kindred topic: "We accept the legacy and forget the benefactor."

The incessant activities of the present do not give us much opportunity to indulge in retrospect, and yet we cannot afford to miss the valuable stimulus afforded by the example set by some of the heroic and classic souls who have had to do with the formation of our professional ideals.

All honor to the pioneers, and a benediction on their memory.

THE FOUR-YEAR COURSE.

At the recent meeting of the National Association of Dental Faculties it was voted to inaugurate a four-year course for dental students beginning in 1917. This is a move in the right direction, provided—that the greatest care is exercised in arranging the work for the additional year, that the proper studies are included in the college curriculum and none others, and that the proper

distribution is made of the various studies for the different years.

If the added year is to be occupied with such studies as the student should have before his entrance on a professional course, or if the studies at present taught are to be "thinned out" to make them extend over the four years, then the object of the additional year will not be attained. This is not the place to consider in detail the proper course for a dental college to teach, but it may be said in passing that subjects rightfully belonging to a recognized high school course have no place in a dental college curriculum, for the simple reason that the student should be familiar with them before he is permitted to enter a dental school.

There are enough subjects not well taught in dental colleges at present of a legitimate professional nature which if adequately taught would occupy the four years profitably without dragging in outside topics to fill the time. One illustration will suffice. The subject of "diagnosis" is seldom taught to students with the thoroughness its importance demands, and a definite course should be given on this subject with the necessary time to make it reasonably complete. This is only one instance. The four-year course can be turned to good account in making better practitioners of the students, but it would be an imposition to fritter away the added time on subjects which properly belong to a preparatory school.

THE EDITOR'S DESK.

PERSONAL EXPERIENCES ABROAD.

ANOTHER VACATION STORY.

(Continued from the February Issue.)

OUR FLIGHT FROM PARIS TO LONDON.

When my friend warned me so earnestly to get out of Paris I went up to our rooms in the Hotel Continental and told my family that we must pack our trunks. They could scarcely realize that it was necessary for us to leave Paris so precipitately. Had they not enjoyed a most delightful day sight-seeing, and

were we not to go to Fontainebleau on the day following? But the increasing fury of the mobs which we could watch from a balcony out of our windows began to put a different aspect on affairs, and introduced a seriousness into the situation which left no doubt as to what we must do.

At this point it may be appropriate for me to attempt to describe as best I may the mobs of Paris. I never before knew what intensity of feeling among human beings meant. The mob apparently springs spontaneously out of the street and melts together like an integral mass of molten humanity. There was a frenzy for war that made the air vibrate. It seemed their very life, and woe betide the man who spoke for peace in Paris that night. For more than forty years resentment against Germany had been nursed. The issues of the Franco-Prussian war and the usurpation of Alsace-Lorraine were like a blot on the escutcheon of French honor, and every vestige of French valor was being cultivated to wipe out the national disgrace. The religion of France had changed from Catholicism and Protestantism to a religion embodying the exalted idea of gaining back Alsace. At Napoleon's Tomb there is a little alcove on one side in sight of the tomb, called the Chapel of the Virgin, and in this is a monument to Turenne. Hanging beside the monument I saw a scroll with a wreath around it and on the scroll I saw the words taken from Turenne: "No man of France must ever consider himself at peace so long as there is a German in Alsace." I saw the French people go up and read this, and turn away with a look which boded not well for Germany if the opportunity ever came. Little did I imagine as I visited the spot that the opportunity was to come so soon.

That last day in Paris, whenever a mass meeting started to oppose war it was charged and dispersed by the cuirassiers or mounted police; and it was on this very evening at the time we were holding our banquet that M. Jaures, the famous Socialist leader, was assassinated as he was leaving the Cafe du Croissant, where he had been dining. He had just returned from a conference of the International Peace Movement at Brussels, of which he was chief, and was shot down as he started to leave the cafe and go to his newspaper office. He edited the paper *Humanite*. He died in fifteen minutes, and his body was carried home through

the streets in an ambulance, escorted by armed police and by a huge, weeping crowd. After the war broke out a street in Paris which had been called "German Avenue" was changed to "Jaures Avenue."

No one can imagine the intensity of feeling in Paris that night. A young friend of ours who had been in Paris a couple of years had called to see us at the hotel, and I insisted that he must remain with us and not venture on the streets. He helped us pack our belongings and all through that terrible night we were frequently called to our windows to see the mobs and listen to their shouts and songs. As my friend remarked, "We are witnessing history this night." It was then after 3 a. m., and the excitement was not in the least abating. Each mob had some distinguishing characteristic, but all were alike in their intensity. And such sounds as some of them made were beyond description. I have seen the North American Indian in his various war dances, I have witnessed the South Sea Islanders on their native heath in theirs, I have seen the Maoris of New Zealand, and the savages from the interior of Africa, but I have never seen nor heard anything to compare in dramatic interest with the mobs of Paris. There was a rhythm to the noises they made, increasing in intensity till in some instances it ended in a dismal dirge or moan which was weird and blood-curdling in the extreme. No mob was complete without women, and they usually clung to the outskirts of the crowd and encouraged the men with shouts and cries, though in some instances they were weeping bitterly. The spirit of the French woman was well illustrated by one of them after the war broke out. Her husband had been killed in an early battle. Later she went to the army headquarters to inquire for her two sons, who were at the front. She asked if they were yet safe. They had both been killed. "Yes," she said, "they are safe—safe with their father." And then as she walked away with saddened spirit she remarked: "I am glad I had them to give to my country." War is terrible, and yet it sometimes brings out the noblest sentiments of devotion in the human heart.

If Europe had to have war, then I am glad I was permitted to be on the spot to see it break out, but I certainly would not want war as a steady diet, and I would not care to be there to see it break out again.

Along between 3 and 4 that morning we lay down for a few minutes' sleep and at 5 we were up. There was much to be done. My young friend and I went down to the railway ticket office to secure my tickets for London, then came back to the hotel to get a bite of breakfast—which we had much difficulty in securing—and to pay my bill at the hotel office. I asked the clerk what the outlook was this morning. "Bad," said he, shaking his head. Then he seemed to want to talk to me, and stepped out into the corridor. "Yes," he remarked, "they have taken nearly all our help at the hotel already." This accounted for the fact that we could scarcely find any one to serve our breakfast. "When I go to my home this morning," he continued, "I will get my notice also, and—I will never come back to the Continental." But it was a matter-of-fact acceptance of fate with him, as it was with every man I talked to. One of my Chicago friends who had arrived in Paris the night before and had to get out that morning met a chauffeur who had in days gone by driven my friend around Paris considerably and knew him well. "Good-by," said the chauffeur, extending his hand, while the tears rolled down his cheeks. "I go to the war tomorrow, and I shall never see you again—good-by." It is fate with all of them. And with this in their hearts they go into battle with grim resolution, willing to die so long as they are vouchsafed the satisfaction of killing some of the enemy first.

I shall never forget the turmoil of those last few hours in Paris. There was a brief lull in the excitement about 5 o'clock in the morning but it was only brief. Paris soon waked up again, and there was a scurrying here and there. The most noticeable thing was the fewer number of taxis on the street—their drivers had been drafted or the cars impressed. We got our baggage on a bus and my family in a taxi, and started for the station. When we arrived there it was bedlam. Such confusion I never saw, and had it not been for the assistance of my young friend who had remained with me all night I should never have managed to get my trunks through. We tipped everybody in sight, and some out of sight. I paid thirty-one francs excess baggage on my trunks, and was glad to get them on the train at that. The guard stood at the gates endeavoring to rigidly exclude all who did not have tickets, but many got by. Every moment the excitement

grew, and I breathed more freely when I got my family safely in our compartment and my trunks on the train. Even then I did not realize what a close call we had. This was the 10 o'clock train, and there was another one at 12. Those who waited for the 12 o'clock train did not get a trunk out of Paris. One man had managed to load his trunks on a taxi, only to find on arriving at the station that it was impossible to get a trunk through. He had no alternative but to send the trunks back to the hotel on the taxi, board the train himself, and trust to luck to ever see his trunks again. Whether or not he did see them deponent sayeth not.

As we said goodbye to the friends who had come to see us off and our train moved slowly out of the station, we saw soldiers lying asleep all along the way by the tracks. They had probably marched all night and were snatching a short nap before beginning the actual business of going to the front. War was the vital thing of the hour—everywhere in all walks of life. The country from Paris to Dieppe, where we were to take boat to cross the channel, is beautiful—as is most of France—and as we rode along and looked out the car windows at the fertile and well-kept farms it seemed a crime to think of so fair a land being devastated by war. We saw government agents rushing here and there in automobiles. They simply drive up to a farm, go into a field, look over the horses, point to the best and say: "We want those for the government." And the best are turned over without a word. There would be no use for words. The next day in all probability the men on the same farm will be called out. No man of France of military age escapes. I was told of one town of 4,000 where not a man was left between the age of 18 and 47. The women must remain home in the agony of suspense, and do the work.

In America we do not know what war means. War in Europe seems to the essential, the absorbing thing—an integral part of their very life. It appears to them the only logical and inevitable way of saving their country, and a country that has been fought for so many times as have most European countries becomes very dear to its citizens. I could not understand the situation till I went there, and while I detest war more even than before, yet I have lost some of my young fond hopes of a universal peace. It is a condition which is confronting Europe and not a theory, a

condition created by the contiguity of many nations in a thickly populated country, whose interests clash, or whose people fancy they clash; and all accentuated by a hereditary hatred which needs only the touch of the torch to set it on fire.

And yet with all of this were it not for one thing there would be no war in Europe. It is seldom or never in modern times that war springs spontaneously from the hearts of the people. It is true that during recent years the French people have nursed a resentment against Germany on account of the manner in which they were treated following the Franco-Prussian war and the loss of Alsace-Lorraine; and yet the people of France and the people of Germany never would willingly have begun to slaughter each other in a wholesale way as they have been doing. The thing that really causes war is the unholy lust for power on the part of the potentates who by the merest chance of heredity and position are entrusted with the destinies of the people. To gratify an ambition born of a thirst for acquisition and personal glory, and to save their own heads, a few men have thrown Europe into war and set hundreds of thousands of men to killing their fellowmen.

One man said to me in London at the breaking out of the war: "I have lived in England and have been a monarchist all my life, but so surely as this war is permitted to continue, it will sound the doom of monarchy. The people are not going to tolerate any system which permits a few crowned heads to throw all the nations into war against their wishes." I was astonished to hear such an utterance as this coming from a man who had been brought up under the form of monarchy which exists in England, and I felt like saying to him that he would have to go farther than the mere abolition of monarchy to secure an ideal and responsible government. The simple fact is that in view of all the occurrences of recent years we must be forced to the conclusion that humanity has not yet advanced very far in real civilization, and while the world is undoubtedly on the way to higher and better things yet the cycle of epochs only seems to prove that advancement is exceedingly slow and that it is interfered with at times by a temporary retrogression toward primitive and barbaric tendencies.

Good must eventually come out of this war, horrible, unnecessary and ghastly as it is; but it is not the good represented

by the acquisition of territory or increased power on the part of any nation. The good is to come from the solemn realization of the utter futility of all such contests and from the lesson which every modern war must teach that the energy of man should be expended in the promotion of the arts and sciences, in the cultivation of better modes of life, in the best systems of overcoming poverty and providing adequate means for all—in short, that man's energy should be devoted toward increasing the comfort and happiness of the human race, instead of being expended on the most certain and skillful method of human extermination.

We reached Dieppe and embarked on the boat across the channel to Newhaven. The boat was terribly crowded, but the passage was uneventful. We had many refugees of war on board, in particular one gentleman and his family from Paris, who happened to be of a nationality uncongenial to the French at that moment. My heart went out to this man. I had seen him a few days before prosperous, happy, efficient in every way for the betterment of his fellowmen, a useful member of society. Here he was a saddened and broken man, leaving his home in Paris, and with it all of his prospects. His departure had been as precipitate as mine, with the difference that he was leaving his home, his all, and with his dear wife and daughter was fleeing to a strange country for refuge. As I have previously remarked, I never before knew what war meant.

Finally we came in sight of the Albion Hills of old England, and I want to confess that they were about the best looking hills I had ever seen. I expect at another time I would not be so profoundly impressed with their beauty—in fact now that I think it over there was nothing particularly striking about them, but the Albion Hills will always remain to me the most beautiful part of England. Suddenly our boat began to behave peculiarly. I thought at first she must have lost her rudder or that the wheelsman was drunk. Instead of going directly up to the dock as any well-mannered boat should do she swerved here and there, careened off to one side, and finally turned completely around, executing a circle and striking out in a foolish manner toward the sea. She then whipped about again as if undecided what to do, but eventually she found herself up to the dock. It then dawned on us that the ship probably knew better what she was

doing than we did, and that in dodging about she was merely steering clear of some mines that had been laid for the entertainment of a foreign fleet if it should come that way.

As we were landing at the dock I gave my hand luggage to a porter and then promptly lost the porter, which was a piece of luck—though I did not feel that way at the time. The confusion was terrific, and it took me so long to locate my luggage and have it examined that the first section of the train for London was packed to suffocation. The porter told me a second section would follow the first in a few minutes, and this was where we were lucky. We would have been uncomfortable in the first section, but in the second we had a fine large compartment all to ourselves, and my “Three Girls,” who had been nearly thirty-six hours without sleep except for the disturbed doze toward morning in Paris, lay down on the broad seats and slept like babies to London.

But I got a terrible shock on my first arrival on British soil. It was about the language. In Paris I had managed to get along very well with the aid of my Indian Girl and the Collector, who negotiate French comfortably enough, and with a species of pantomime which I had assiduously cultivated myself for the purpose; and also from the fact that many people in Paris speak English. It was only once in a while, when a citizen of Paris got after me with a running fire of r-r-r’s and z-z-z’s all mixed up unintelligibly, that I had to throw up my hands and run to cover. But on the whole I felt secure in Paris—sort of protected-like and comfortable.

When I reached England it was different. I was absolutely helpless. They spoke a language that I had never heard uttered before, and my family were as dense as I was—there was some satisfaction in that. The first taste I got of this new language was from the guard who closed the door of our compartment on the train. I asked him how long it took to run to London. Right off the reel like lightning came the information quicker than I can write it, “Naournoff.” And the door was closed and locked. I timed the train to London to see what his answer was, and it took an hour and a half. Of course it must not be imagined that the better class of English speak like that, but the proverbial Cockney can slaughter the English language with precision and

exactness. This fact is recognized even in England, where on one occasion a London paper offered a prize for the best or most typical Cockney sentence. The one that took the prize simply said: "The biby's nime was Jine—pline Jine." Every word except the adjective and the verb was slaughtered to make a Cockney holiday—a tolerably fair record, even for a Cockney.

C. N. J.

(*To be continued.*)

PRACTICAL HINTS.

Edited by J. E. Schaefer, D. D. S.

(This department is for busy readers. We want short articles containing practical hints—the shorter the better. No article must exceed 200 words, unless of exceptional merit. Every dentist has some useful hint that has been of value to him, and if he will only put it in print it may be of equal value to others. That is what this department is for. Due credit will be given for every article sent. Address J. E. Schaefer, 1745 W. Harrison St., Chicago, Ill.)

An Exception:—It is very seldom that a drill can be safely used in the engine where a pulp canal is narrow and constricted. The exceptions are the upper bicuspid.—*E. S. Best, D. D. S., Minneapolis, Minn.*

To Sterilize Instruments:—Use an oblong agate affair bought at hardware store, just right size to hold forceps, etc., fill with water, using about a teaspoonful or more of common washing soda costing about one or two cents per lb.; remove forceps after boiling and when right to handle polish with towel; will look like new and there will be no "rusting."—*C. P. S.*

The Lower Plates:—Why is the flat lower jaw the problem of the dentist?

Because absorption has taken place to such an extent that the lingual muscles are attached to the ridge. Consequently, the plate cannot extend over the margin, otherwise it is constantly lifted by the tongue, and the patient complains of the plate being loose, which is an unnecessary looseness.—*L. P. Haskell.*

Seamless Crowns:—I can see no advantage in the seamless shell crown and in some cases of a hard occlusal stress there is a disadvantage in the way of a spreading of the crown at the gingival, due to the fact that the grain of the metal in a seamless crown runs parallel with the long axis of the tooth and the tendency of the gold is to assume its original flat shape. For this reason seamless crowns should be reinforced with a small amount of 22k solder at the gingival.—*R. E. MacBoyle, D. D. S., Chicago, Ill.*

A Way to Keep Oil of Cajeput:—Many practitioners use oil of cajeput or some other oil for smoothing off the wax model for an inlay before removing from the cavity. To prevent using an excess and spilling the contents of the bottle, take an ordinary medicine bottle, fill with absorbent cotton. Pour oil on this cotton until slightly saturated. When the pellet of cotton, held in the cotton carrier, is immersed into the oily cotton of the bottle it will not become oversaturated.—*F. S. Dilger, D. D. S., Chicago, Ill.*

Dowel for Upper Bicuspid—In constructing a dowel or post for an upper bicuspid I take a piece of heavy gauge D. A. wire cut the required length and then place it on the anvil and strike a few blows with hammer until it is slightly flattened 2-3 of its length. I then cut with small saw three parts way down the center of wire, then bend the two sides outwards in such a way as to follow the bifurcation of the root. I then shape up the post with thin edge carborundum stones. A post constructed in this way possesses greater strength than the post usually sold at our supply houses for this purpose.—*A. G. Salisbury, Takaka, New Zealand.*

Repairing Plate With Goslee Tooth:—A case presented itself to me the other day wherein I was somewhat at a loss as to what kind of a tooth to put in. As in previous cases I took my Goslee case of teeth, selected the proper tooth, and out of thirty gauge pure tin I swaged a backing for it. I then selected a split pin (Davis Crown Bicuspid), cut the points off sufficiently to set it in the rubber plate which I had previously prepared. Putting the tooth and backing in place I waxed them, after which I removed the tooth and vulcanized the plate. After the case was properly

finished, I then cemented the tooth in place. The indications for a Goslee Replaceable Tooth in cases such as the one I have mentioned, would be in replacing teeth that have broken out and that do not seem to be strong or break off frequently. It is a very simple method, and I believe that a stronger piece of work can thus be obtained.—*Fred R. Felcher, Chicago, Ill.*

Five Requirements:—In order to make a really dependable gold foil filling certain things are necessary, and may be summarized as follows: (1) The cavity must be properly prepared. This includes not only the outline form which may be best in relation to conditions of environment, but the form must be such as to permit good access, good retention and sufficient resistance to the stress of mastication. (2) The field of operation must be kept thoroughly dry. (3) For all proximal cavities sufficient separation must be obtained to permit of a proper finishing with contact restoration. (4) The direction of force must be such as to insure proper adaptation to the cavity walls. (5) The force used must be sufficient to give a specific gravity above 16 in positions where the stress of mastication must be withstood. In this connection, emphasis should be laid on the fact that, while well malleted fillings are much harder than castings, fillings which are not so malleted are liable to be even softer than the castings.—*Arthur D. Black, D. D. S., Chicago.*

Gold Filling vs. Gold Inlay:—The only question for us to settle then is whether the inlay is as good a tooth saver as the gold filling. In answering that question the personal equation plays so great a part that it is difficult to arbitrarily say that a gold inlay will save a tooth as well as a gold filling, for we may compare a good foil filling with a poor inlay or vice versa. I can say, however, without fear of successful contradiction, that a poor inlay is vastly superior to a poor gold filling, for the cement lining will preserve the tooth for a long period of time even though the inlay does not fit the cavity; indeed, I have seen inlays that did not seem to have been made for the cavity in which they were placed, so great was the discrepancy between the inlay and the tooth, and yet there was no decay around the margins. I have two such inlays under observation now that have been in the

teeth for four or five years and though there have been other cavities in the patients' teeth, showing that there was a susceptibility to decay, there was no decay around these imperfect inlays. If a poorly made gold filling is placed in a tooth the leakage commences immediately and failure begins as soon as the rubber dam is removed from the tooth.—*J. V. Conzett, D. D. S., Dubuque, Ia.*

Applying Desensitizing Paste to Live Teeth Preparatory to Crowning:—Separation is secured with separating discs and the lingual and buccal plates of enamel are ground away, also the enamel of the occlusal surface. The object being to get as complete an exposure of dentin as possible, particularly so in the regions requiring additional grinding. The enamel may be ground away without pain or discomfort to the patient.

A suitable celluloid tooth form or shell is next selected and trimmed to approximate the gingival margin of the tooth, after which it is placed in hot water to soften.

The tooth is now protected with cotton rolls and thoroughly dried, and the Desensitizing paste applied to all areas requiring additional grinding. For the purpose of sealing the celluloid cap in position either a temporary cement, a quickly evaporating cavity lining or sandarac may be used. I believe sandarac varnish to be the most satisfactory. The tooth is covered with sandarac and the softened celluloid cap pressed to position—doubling the celluloid upon itself lingually and buccally if necessary to get close adaptation in the gingival third. While still soft the patient closes to secure proper occlusion, after which the form is chilled to harden. This will seal perfectly for forty-eight hours or longer if necessary.—*J. H. Harrison, Hazleton, Pa.*

BOOK REVIEWS.

ETHICS AND JURISPRUDENCE FOR DENTISTS. By Edmund Noyes, D. D. S., Professor of Ethics and Jurisprudence in Northwestern University Dental School. Printed and bound by Tucker-Kenworthy Company, Chicago, 1915.

To those who know the author of this book personally, a written review of his work is superfluous. There never was a

man in the profession who has lived up to the letter and the spirit of ethics more religiously than has Edmund Noyes, and it seems most appropriate that he should be the author of a book on this subject.

The work is divided into three parts; first, "Ethics"; second, "Professional Ethics"; and third, "Dental Jurisprudence." More than one-half of the book consists of a consideration of ethics in general, and in justification of this the author appropriately says in his preface: "It is possible some may think that a disproportionate amount of space has been given to the subject of general ethics. It is the writer's belief, however, that it is worth while for young men preparing themselves for any profession or any business to give some time to a study of the fundamental principles and sanctions of morality, and the powers and dispositions of mind and heart of which the conduct of life should be determined and the rules of duty should be obeyed; in other words, the virtues and duties which characterize good men. Professional ethics can have little authority and command little respect unless it is understood to rest upon the solid foundation of the general principles of morality."

The author acknowledges his indebtedness to Paulsen for much of that contained in his consideration of general ethics, and in fact he makes copious extracts from Paulsen's "System of Ethics." If there could be any criticism of a work so uplifting and helpful as this it would be that the author has relied too much on others and has not injected enough of himself into the volume. But this is only in keeping with the innate modesty of the man, whose natural tendency is always to magnify the virtues of others and to minimize his own. Dr. Noyes has it in him by virtue both of his natural intellectual endowment and his rare stability of character to create an extensive volume without copying a line from another author; in witness whereof permit us to quote a single paragraph from Chapter X on "Professional Ethics." It says: "In such professions as medicine and dentistry the human element comes to the front and becomes of primary and chief importance. The practice of medicine and dentistry consists in personal services to supply personal needs and the matter of making something and selling something takes a subordinate and comparatively insignificant place. It is true there is a business

side to dentistry and medicine, and there is a bargain and sale of professional services, but the difference between selling professional services and selling commodities, or even one's time in some mechanical or routine employment, is so great that different terms are used to describe them. We sell commodities, or time in ordinary employments, for a *price*. We perform a professional service for a *fee*. When you make a gold filling, or make a crown or bridge you charge a fee for your services, you do not sell the crown or bridge for a price."

Here is a definite and clear cut statement of a question which is often overlooked and confused in the minds of men ostensibly practicing professions, and it is only typical of the good common sense running throughout the work. We unreservedly commend this book as a most satisfactory presentation of the subject, and we bespeak for it a royal reception on the part of the profession. It will many times repay any man in dentistry for reading it and committing its precepts to memory.

NOTES ON DENTAL ANATOMY AND DENTAL HISTOLOGY—HUMAN AND COMPARATIVE. (A Pocket Tome.) With illustrations. By T. W. Widdowson, L. D. S., England, late House Dental Surgeon to the Liverpool Dental Hospital. Third edition, revised and enlarged. Price 7/6 net. Published by John Bale, Sons & Danielsson, London, 1915.

This edition is a substantial improvement on the previous issues, and it has surely graduated out of the "pocket" class. It is a volume of 185 pages, well put together and carefully prepared. To make it more serviceable for students blank leaves are inserted at every other page for the purpose of making notes. Silhouette sections of teeth, both cross and longitudinal, are used to show pulp canals, and this work can be duplicated by the student to his great advantage. The book is helpful throughout, though in some instances the nomenclature is not quite in keeping with modern usages. In this connection we sincerely hope that an authorized international committee will be granted power to harmonize and systematize our nomenclature, and make it more uniform the world over. Much has already been done in various sections, but there still remains the need of a wider movement and a more uniform international standard.

MEMORANDA.

[Society notices will be given insertion in this department free of charge. Subsequent insertions will be charged for at the rate of \$2.00 an inch.]

ILLINOIS STATE DENTAL SOCIETY.

The fifty-first annual meeting of the Illinois State Dental Society will be held at Peoria, Ill., May 11, 12, 13 and 14, 1915. President, J. M. Barcus, Carlinville; secretary, Henry L. Whipple, Quincy.

THE KANSAS STATE DENTAL ASSOCIATION.

This association will convene in Topeka, April 27th, 28th and 29th, 1915. We will have a most unique program. Dr. Thomas P. Hinman of Atlanta, Ga., will be the guest of honor. A. L. Benton, Secretary, Garnett, Kansas.

MISSOURI STATE DENTAL ASSOCIATION.

The Golden Jubilee meeting of the Missouri State Dental Association has been postponed until June 10th, 11th and 12th. Elaborate preparations are being made to celebrate the semi-centennial meeting of this association on an elaborate scale. See special announcements in next issue of this journal. For information, address S. C. A. Rubey, Secretary, 1017 New York Life Building, Kansas City, Mo.

TEXAS STATE DENTAL ASSOCIATION.

The Thirty-fifth annual meeting of the Texas State Dental Association will be held in Galveston, Texas, May 19, 20, 21 and 22, 1915. The special feature of this meeting will be post-graduate lectures and clinic work.

Dr. G. Walter Dittmar, of Chicago, will present modern scientific bridge work and removable partial dentures, with preparations, technique, and principles involved. Dr. B. F. Thielen will present "Plate Work"; Dr. T. G. Duckworth, "Orthodontia"; Dr. R. D. Griffis, "Nitrous Oxid Analgesia, and Anesthesia"; Dr. Julian Smith, "Pyorrhea"; Dr. J. M. Murphy, "Local Anesthesia."

Exhibitors are requested to attend and to write Dr. A. L. Frew, Dallas, for space. General clinics, last day. Clinicians write Dr. W. H. Nugent, Fort Worth. For any other information write the Secretary. C. M. McCauley, President, Dallas, Tex. W. O. Talbot, Secretary-Treasurer, Fort Worth, Tex.

EXAMINATION OF DENTISTS FOR THE U. S. ARMY.

The Surgeon General of the Army announces that examinations for the appointment of acting dental surgeons will be held at Fort Slocum, New York; Columbus Barracks, Ohio; Jefferson Barracks, Missouri; Fort Logan, Colorado, and Fort McDowell, California, on Monday, April 12, 1915. Application blanks and full information concerning these examinations can be procured by addressing the Surgeon General, U. S. Army, Washington, D. C.

The essential requirements to securing an invitation are that the applicant shall be a citizen of the United States, shall be between 21 and 27 years of age, a graduate of a dental school legally authorized to confer the degree of D. D. S., and shall be of good moral character and habits.

Acting dental surgeons are employed under a three years' contract, at the rate of \$150.00 per month. They are entitled to traveling allowances in obeying their first orders, in changing stations, and in returning to their homes at termination of service. They also have a privilege of purchasing certain supplies at the army commissary. After three years' service, if found qualified, they are promoted to the grade of dental surgeon with the rank of first lieutenant, and receive thereafter the pay and allowances appertaining to that rank.

In order to perfect all necessary arrangements for the examination, applications must be in the possession of the Surgeon General at least two weeks before the date of examination. Early attention is therefore enjoined upon all intending applicants. There will be nine vacancies to be filled.

RED CROSS FUND FOR ORAL AND DENTAL INJURIES.

At the meeting of the American Institute of Dental Teachers held at Ann Arbor, Mich., on January 26th, it was decided to take steps that should result in the raising of a fund to be used through the Red Cross Society, in giving relief and aid to the soldiers in Europe who are suffering from oral and dental injuries. The president was instructed to appoint a committee to take charge of this matter. President F. W. Gethro, under this instruction, appointed the following executive and general committees:

Executive committee—Henry W. Morgan, E. A. Johnson, Ellison Hillyer, John F. Biddle, secretary; C. R. E. Koch, chairman.

General committee—E. C. Kirk, Philadelphia; J. H. Kennerly, St. Louis; H. C. Miller, Portland, Ore.; D. M. Gallie, Chicago; John F. Biddle, Pittsburgh; E. T. Darby, Philadelphia; Alfred Owre, Minneapolis; B. Holly Smith, Baltimore; E. A. Johnson, Boston; Frank Holland, Atlanta; D. M. Cattell, Memphis; Frederick R. Henshaw, Indianapolis; S. W. Bowles, Washington; E. H. Smith, Boston; A. H. Hipple, Omaha; Ellison Hillyer, New York; Truman W. Brophy, Chicago; D. H. Squire, Buffalo; H. E. Friesell, Pittsburgh; Henry W. Morgan, Nashville; I. N. Broomell, Philadelphia; Wallace Wood, New Orleans; Frank T. Breene, Iowa City; H. L. Banzhaf, Milwaukee; J. G. Sharo, San Francisco; G. V. Black, Chicago; W. T. Chambers, Denver; H. M. Seamans, Columbus; J. D. Patterson, Kansas City; N. S. Hoff, Ann Arbor; C. N. Johnson, Chicago; H. L. Wheeler, New York; L. E. Ford, Los Angeles; C. R. E. Koch, Chicago; H. B. Tileston, Louisville.

The executive committee is contemplating the issue of contribution certificate booklets. Each booklet will contain twenty (20) certificates or coupons certifying that the holder thereof has contributed twenty-five cents to this fund. This certificate will be neatly lithographed, something like national currency. It will be printed in lilac ink—the color of the dental profession—and bear upon its face the Red Geneva cross.

It is hoped that the dental schools, dental students and dental societies, as well as the profession at large, will become sufficiently interested in this propaganda to secure a large enough fund, through these small contributions, to secure real relief for the class of war sufferers for which it is designed. That it may aid in the establishment of several special hospitals or wards devoted to dental or oral surgery injuries, within the belligerent zone of Europe, is the ultimate purpose of this movement.

It is expected that these booklets will be ready for distribution on or before March 1st. Applications for them may be made to Dr. John F. Biddle, of Pittsburgh, Pa., secretary of the executive committee; or to Dr. C. R. E. Koch, 31 West Lake Street, Chicago, chairman of the committee, before March 1st. After that date all the members of the executive committee and general committee will be in a position to supply them.

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THE PROBLEM OF DENTISTRY IN JAPAN.

BY ALFRED OWRE, B. A., M. D., C. M., D. D. S.

Dean, College of Dentistry, University of Minnesota, Minneapolis, Minn.

When visiting a foreign country it is always important to bring to it an unprejudiced mind if such a thing is possible. At least one should not be altogether biased in favor of one's own country, its institutions and culture and all things in connection therewith. We ought really to be receptive and yet analytic in our attitude. Above all we should be reserved and fair in our conclusions and criticism.

After my first actual contact with Japan I was tempted to put in writing my impressions in regard to dentistry. This was five years ago; time, reflection and still another prolonged visit to this attractive land has not modified these original impressions very much. If anything there should be more dynamic value in thoughts after they have had time to mature.

The sincere dentists of Japan feel keenly that things are not right, and I concur with them in this. There seems to be a low ideal continually interposing itself, which I think does not belong here, where there is a general striving on the part of the people to reach perfection. The present standards of dental practice are out of harmony with the spirit of the race.

Before attempting any remedial suggestions, however, it is always best to possess one's self of as much material as has a bearing on the situation. We need a perspective. Dentistry, like all other questions, must be considered relatively in the scheme of things. This is all the more necessary in the present instance, owing to the recent intense changes which have taken place in Japan.

It is said that to be too brief is perhaps the lesser sin. I am afraid I shall violate this aphorism because of my high regard for the importance of dentistry in relation to the welfare of humanity; and because, in studying the whole question of dentistry in any country, it is necessary to indulge in comparisons with other countries. Hence the American contribution, such as it is, must be brought into the equation.

The history of Japan in all its phases affords a most exquisite flight; we shall find many items in her evolution, be it social, economic, spiritual or intellectual, which will aid in the solution of her many problems. Moreover, we shall thereby arrive at a conception of the spirit in which she has worked out all her worthiest achievements and in the light of this conception be able to suggest the methods by which dentistry also may be brought into accord with the general plan.

CHARACTERISTICS OF THE JAPANESE.

We are affected in so many different ways by things and people; I can attempt only a brief sketch of those traits of Japanese character which immediately impress the traveler, commanding both his respect and his affections. Amongst my newspaper clippings I find the following quotation:

"Early visitors were pleasantly surprised by their cleanliness, and their friendly human nature, which is not lacking in dignity, freedom, self-consciousness, intelligence and sensibility to the beauty of nature and the advantages of Western civilization."

The cleanliness of the people, in contrast to the filth and slovenliness of other eastern countries is particularly striking, and the second item calls attention to their friendly and humane nature. Thackeray says that the object of life is to be friendly with everybody. Such a beautifully poetic interpretation of our business here seems to be especially fitting to our eastern friends. They show their amiability upon every occasion and their regard for the feelings of others is a most notable characteristic.

Again, the third and fourth items: they are not lacking in dignity and freedom, which simply analyzed, means that they are not slaves and masters, but workers in their respective places for the common good. The Japanese find in their daily occupation an adequate utterance for many faculties.

Their respect for government, their loyalty and patriotism needs no further illustration than a mere reference to the Russo-Japanese war. It begins in the cradle. Devotion and love of children for their parents and the obedience of the youth of Japan are characteristic traits which we are wont to pass over altogether too lightly.

We cannot but envy their self-control; no matter what the provocation there is never any violent exhibition of temper. Such demeanor is generally condemned and lowers the individual beyond redemption. They are frugal, sober, just, true, honorable and candid. We are keenly aware of their industrious qualities and general desire for knowledge; in acquiring the latter they show a degree of quickness and perseverance which is quite marvelous.

Strangest of all to the westerner is their childlike attitude towards the whole scheme of life. In fact, youth seems to be preserved for a very long time. Grownups play like children, their feelings are vivid and they respond to sense stimuli to a marked degree. In other words, they are capable of appreciating new and fresh experiences and to enjoy them. The beauty of life is manifest wherever one goes among them. They are healthy in a positive sense and consequently they can do much that would be extremely difficult for others where health is a negative matter. The people are cheerful and love peace. A general sense of harmony and economy prevails over their activities. Let me quote from Edward Carpenter's "Angel's Wings":

"This marvelous people seem to have the gift that we lack. They have understood the law of economy in art, in their whole handling of life; in their ultra simple house construction, furniture, dress, in their pictorial art, in their manners, they have known how to produce results with the least possible expenditure of material; they have shown the highest, most skillful, touch on life."

Life is an art and we roam to find the highest expression in this sense somewhere. Let us say that life is the art of arts. Japan gives us a lofty and tranquilizing rendition of it. This daring assumption will need a great deal of defense; the cannons of occidentalism have been leveled offensively towards the east for some time past. The truth is that with our philosophy of fixity and inelasticity we are more apt to resent a higher ideal than to embrace it as a working hypothesis. To mention life as the art of arts in

connection with Japan involves many antecedents. An incomplete skirmish with this momentous problem is unsatisfactory in the extreme. There is so much to look into, and there would be so little left of our cherished plums. But Mr. Carpenter's pithy observation certainly tells us that the Japanese have shown a wonderful adjustment to the ever changing conditions of life. How do they accomplish this so easily? What are the reasons for this? For the moment I experience some difficulty in denying myself the pleasure of a negative outburst regarding occidental ideals. There is a lesser degree of poison in the physical and mental life of this island people. This statement ought to precipitate a discussion of every item which makes up the sum total of our lives. Our aimless drifting versus conscious aim may be the title of this new human drama.

I have attempted to sketch the distinctive characteristics of the Japanese, and to suggest their controlling theory of life. The main question now is: What are the causes and influences responsible for the results seen in Japan?

I shall attempt to answer this only partially. Dr. Edward Howard Griggs says: "There is a deep organic basis in the life of a people, which once established shows itself in its every expression." Many items will interest us and aid us in finding the answer to our question.

A study of the origin of the race can contribute little, owing to a lack of authentic data. Some claim that they are Mongol, and some Malay. More interesting is the view held by others that there were two streams meeting in Japan, one from the north of the mainland, and one from the south; the former contributing brains and culture in general, the one from the south a magnificent bodily strength.

In the case of Japan the physical aspect of the country has had a peculiarly important influence upon the character of the people. It is mountainous, or rather, a ridge of volcanic rock rising somewhat precipitously from the ocean, less than one-eighth of its area being level ground. The matchless mountain, Fujisan, is the great attraction and is revered by the Japanese to a marked extent. It is their ideal of the beautiful in nature. It has been worshipped for centuries by the mass of the people who regard it not only as the shrine of the dearest gods, but the certain panacea

for their worst evils. Waterfalls, streams and rivers abound, the extent of the seaboard should be noted, there are four thousand islands and several small inland lakes. The extremes of climate, heat, cold, rain, snow, wind, typhoon, and earthquake all mean something in the great scheme of things. The general aspect of the country is picturesque. A recent traveler says, "No scrap of scenery is ugly or uninteresting." The soil is very productive and is thoroughly cultivated. It is often referred to as a land of waving rice fields, as well as a veritable country of flowers. Many useful minerals and metals are found in great quantities. The topography of the country necessitates a struggle for existence; this is a great blessing. But to obtain a living should not absorb all our energies and thus interfere with a full expression of the spirit. The Japanese have found a golden mean, an Aristotelian view of proportion and selection, as it were.

Japan is endowed with landscape and seascape picturesque enough to satisfy the longings of the true artist everywhere. They seem to have appreciated all this for a very long time and a genuine enjoyment from their association with nature is another factor which we cannot exclude. M. B. Huish, an English writer, refers to this as follows:

If there is one characteristic which marks taste and refinement in a nation it is a love for nature and the beauties which adorn it. In European nations this culture has advanced *pari passu* with civilization, but only within the last century has it really permeated downwards so as to infiltrate through all classes."

A particularly sweet reference to this is found in a lyric of an early date; the author is unknown to me:

"Should the mountain cheery cease,
In the spring-time of the year,
With its mass of new-born bloom
Us poor mortal men to cheer,
Then would heart of spring be doomed
And its brightness fade away."

The beauties of this island Nature, however, would not be appreciated if there was not something else to foster it. Nature's grand appeal to man would remain like the Sphinx if there is no nourishment to the ideal.

The history of a race ought to yield something to the equation. In Japan this is closely connected with mythology and they are often treated together. The Japanese are not only very proud of everything that relates to their history, but also very well informed about it. In the form of legend and story, it flourishes around the family hibachi; it is emphasized in their education at school; it is the inspiration and theme of art and of literature. Japanese history is described as being fascinating, abounding in heroism and brave deeds.

Their traditional story of the creation ascribes to the reigning dynasty a divine and mythical origin, the Mikado being in direct descent from the Goddess of the Sun.

The mythology of Japan, according to Gibbon, like that of Greece, is full of beauty, pathos, poetic fancy, charming story, and valorous exploit. It forms the soil of the national art, whether expressed in bronze, porcelain, enamels, colors, poetry, song, picture, dance, pantomime, or romance. It is the doctrinal basis of the ancient and indigenous religion, called Kami-no-michi or Shinto (the way of the gods).

Perhaps the most important element in a nation's development is its religious ideals. Some of our eminent European scholars have expressed themselves in curious, not to say ridiculous ways, about the Japanese religion. Let us examine the various streams of religious thought which have influenced Japan.

The early ancestor worship, or Shintoism, still survives. Spencer says, "The cult of ancestor worship is the origin of the primitive religious impulse in humanity." It is based upon filial piety, love and the elements of fear. The radical elements of religion are found in Shintoism, which are: An intuition of God, a sense of human weakness, a belief in divine government, distinction between good and evil, and hope of a better life. Shintoism or Kami worship aims at the happiness of earthly life and assumes that the souls of the departed can essentially aid in securing it. It teaches simplicity and courtesy in social life, as well as careful attention to the least detail of life's surroundings.

In the sixth century the great Hindoo religion, which numbers 500,000,000 adherents, was brought to Japan through China

and Corea. This was merged with Shintoism. They did not antagonize each other, the innate law of economy again asserting itself. What was good in Buddhism was accepted with alacrity, and Buddhism has indisputably exerted a civilizing power unequalled by any other in Eastern Asia; it has driven out the bloody sacrifices of earlier cults, has counteracted the rigid spirit of caste, and spread a mild and peaceful tone of thought, especially among the great masses of the people. The softening and humanizing influence of this religion ought to be welcomed everywhere. Buddhism had a formative influence upon its professors, because it held before them lofty ideals, which could only be attained by continuous moral effort. It supplied rich nourishment to the imagination. Knowledge and enlightenment is the condition of Buddhistic grace, not faith; self perfectionment is the means of salvation. Buddhism was now the teacher under which Japan grew up, but Shinto ideals are still in evidence; in fact, there is no nation in universal history which displays such everlasting tenacity and fidelity to a few rudimentary religious conceptions belonging to the infancy of humanity. Another contribution to religion, or perhaps it would be better to say to the ethics of Japan, was the teachings of Confucius and Tao Lotze.

We are now to test the Japanese civilization on the basis of their religion, and at once occidental critics will assert that Japan has no religion, nor are they a religious people, and it must follow that they are lacking in ideals and moral aims as well. The whole matter is a bit delicate; certainly if the Japanese have no religion according to occidental interpretation we are not all of us so prejudiced as to ignore the results. Be it Shintoism, Buddhism, Confucianism, or a system of morals, something in this wonderful category has made it possible for the Japanese to find expression of his true self in his daily task. Something has taught him to regard the feelings of others to a rather marked degree. We command "Thou shalt not envy," etc.; he, on the other hand, acts and arranges life so as to prevent it. There must be some leaven at work which makes possible a readjustment to the ever changing conditions of life without such disasters as are often involved in the occidental world.

We have now concluded a broad survey of the more important elements which have contributed to Japanese history and civilization, and have seen how each has aided the growth of this great idea that life itself is an art, to be worked out in terms of harmony and beauty. To live life in accordance with the inner vision is the aim of all men; but very few of us are allowed to do so. Indeed, the Anglo-Saxon has no great passion for perfection; he is satisfied with doing the best he can at the present moment, and admits the presence of the imperfect, the vulgar and the grotesque in most of the affairs of life without great shock to his sensibilities. It has been said that none but the Athenians spent their lives in the realization of their ideals. Yet the Japanese have much in common with them in this regard. The beauties and grace of ancient Greece can still be found in Japan. The Japanese realize that art is a condition of humanity, a means of intercourse, a fusion of the same feelings. They do not regard it as a thing apart from the ordinary course of life, reserved for rare moments of inspiration and abstraction. Apropos of this, J. H. Henderson, in his book called "Education and the Larger Life," says as follows:

"Probably to no country do lovers of the beautiful look with such wistful eyes as to Japan. There one sees, or fancies that one sees, a nation which is truly esthetic, or which has been in the not very distant past. At first it seems to be a merely decorative art. It concerns itself with costume and ceremonial and flower arrangement and domestic architecture and landscape gardening, and with the utensils and apparatus of daily life. It seems something less ideal and elevated than the western art of the gallery and museum. But when you come to think about it, this eastern idea is the true one, the idea of having art minister to the daily esthetic needs rather than to intermittent esthetic duty."

To consider life as an expression, as an art then, especially in connection with Japanese civilization, is extremely fascinating because the whole fabric of life then proves that there is no cleft between the two.

For a nation that strives constantly to bring into harmony with such an ideal the minutest details and occupations of life, the dangers of a too rapid assimilation of foreign methods or

institutions are particularly grave. The noble words used by the late Lord Leighton when discussing the art of Spain seem to force themselves to the surface just at this point.

"Nations not less than individuals may, by the insincere pursuit of what is foreign to their temper, be turned from the true path of their artistic development and may also by sincerity be restored."

With these considerations in mind, I am ready to point out what I consider to be not only the weakness in, but also the remedy for, the present status of dentistry in Japan. Can the difficulty not lie in a need for readjustment to changed conditions?

I realize I have roamed quite a bit in order to indulge in a speculation as to the future of dentistry. The status of dentistry in the past partook of the general atmosphere. Whatever their standards of that day, they were sincere in their interpretation and tried to realize the very best. The old specimens of dental work prove this. My contact with a few of these practitioners also affirms it. In these early times the percentage of caries was not so great, but loosening of the teeth was, of course, to be found, hence it was the principal work of the dentist to restore lost teeth.

With Westernization came some change in food also, such as our finely ground flour and meat. The rice had been prepared without the husk for some time; however, the percentage of caries is still called low by recent investigators. This is especially true with the aborigines of Japan, where I found very little caries and particularly no marked cases of so-called pyorrhea alveolaris.

Western civilization impressed the Japanese with its medical science and they were not slow to get into touch with the very latest developments and progress as embodied in the universities of Germany. It was the constant aim to reach out for the most perfect thing wherever they could find it. It is to be expected that American dentistry should be heard from. Now, what was the standard of this country at the time when these eager people were trying so zealously to introduce what they believed to be the best? Upon this matter I refer you to an article on "Dental Education," published in the *Dental Cosmos*, February, 1914.

To reiterate briefly, I should say that America was, during this time, trading upon its past while yet in the height of patronage from foreign students. The Japanese students simply brought home in knowledge a debased article. Its easy acquisition was soon noised about and the result was an influx of men often lacking in the essential qualifications for the practice of dentistry; while in the main the theory of selection operates unconsciously in the east, there is always enough human tissue in any civilization which will lend itself to any occupation, providing the belly is henceforth filled. This is largely the huckster element, which always buys cheaply and sells high. The ancient status of this class in Japan was not an enviable one; they were practically outcasts.

Perhaps the general result of the whole program of foreignization was in many instances a blind acceptance of things because they were foreign, dentistry included. It is a somewhat common thing to see gold crowns on the anterior teeth; this appeals to the primitive vanity of man; reversion to a lower ideal is brought about in the organic world with comparative ease. But, nevertheless, the true dentist of Japan and the most educated people there as well have been in revolt against such practice for a long time. They are jointly concerned with a restoration to something better and more in keeping with their ancient ideals. This is most encouraging. It is very much akin to the revolt of the enameller who told our western commercialist that he was going to make a beautiful garden so that his fellow workers would be stimulated thereby to reach greater and more ideal results.

This is an emphatic illustration. I quote it in full:

"You remember, perhaps, that fine incident of the cloisonne maker who brought his wares to one of the earlier Paris expositions, and sold them to such excellent advantage that he found himself quite unexpectedly in possession of fifty thousand dollars. He was warmly congratulated, and it was suggested to him that he could now enlarge his factory, and with a market already eager he could soon make a fortune. But his reply was something better than that. It was that his ware would become inferior if he turned it out

in such large quantity; that he would spend the money, rather, in creating a beautiful garden around his workshop, and that his work-people, in the midst of this encircling beauty, would then produce still more beautiful ware." C. H. Henderson, "Pay Day" (Chapter V, Cause and Effect, pages 152-153).

He spoke the real word of the true Japan. It is a lyric rich in truth and philosophy. It was at once a reaction and a moral interpretation of his understanding of what ought to be. It was the positive longing of his soul and reflected Japan's right to a very high place in spiritual things. He suggested the necessity for readjustment by this subtle response. He builds a garden, because by this means he will realize greater perfection in his particular expression, which in his mind shall function more highly in the scheme of life. The wealth and splendor of Nature's colors are to have more permanence and to be of greater service to humanity by using materials in new combinations. The softening and humanizing influence of their ancient cult is to be made more and more effective because the stream of national life is richer. The artists have emerged from the bombardment with clarified ideas as to their own mission.

The people of Japan realize more fully than ever that the great influx of foreign things brought in its train also many evils, and that they have before them the great task of reconstruction. They appreciate and value our contribution which makes for greater human happiness, but in the program of reconstruction it looks as if Japan must depend largely upon herself. She must draw upon her ancient ideals in this hour of trouble. There are men capable of readjusting dentistry in Japan, but the difficulty here again, as elsewhere in the world, may be a dependence upon economic conditions. To endow technical schools is no small part of a nation's business, but to preserve the nation as a world power is deemed a more important one at present. So dental education must be considered relatively in the management of the country's affairs; it cannot suffer in the long run, because these island people are intensely serious in matters of education generally. Perhaps Oriental atmosphere, with its lofty silence, will lend itself again to a greater intensification of self; and that the soul of the East

will again master the situation. Let us hope that our Japanese friends, with their abundance of concrete expression and general appreciation of what is true and essential for the perfection of the edifice, will in time also be able to find a higher workable ideal in dentistry, and it should be our hope also that those who have collectively contributed to the despiritualization of dentistry in this spiritual land may in the not distant future be able to nourish the sprouting plant wherever it is bursting forth.

My general conclusion is that the great and only remedy for such conditions as we have in Japan today is sweetness and light, and since the Japanese have shown for ages their power to nullify barbarism by the pursuit of culture, it is quite evident that they have the most effective weapons, the germs of reconstruction, within themselves and their country. To reiterate the words of Sir Leighton, anything which is foreign to the nation's temper cannot permanently remain. Their traditional idea of honesty in life must sooner or later assert itself against the present disorder, with all its impedimenta. I am certain, especially in the present instance, that low, materialistic ideals and unesthetic standards have within them also the germs of disintegration, and to the extent that they are antithetical to the main current of national life will they last and no longer.

We must revive ancient "Bushido"; our need is a spiritual challenge, and may this subtle instrument of our Far Eastern friends also unconsciously arouse the real human feelings and efforts of the workers in the Occidental West.

ETIOLOGICAL RELATION OF FOCAL INFECTIONS TO REMOTE DISEASES.*

BY ROBERT B. PREBLE, M. D., CHICAGO, ILLINOIS.

When your chairman asked me to speak to you upon the subject of the relation of focal infections to remote diseases, he said that he wished it because he had been told that my ideas upon the subject were rather conservative. That all depends

*Read before the Chicago Dental Society, January 29, 1915.

on one's definition of conservatism. If it is meant that I am opposed to the extension which this idea has had in recent years, merely because they are recent, I certainly am not a conservative. My lack of sympathy with some of the ideas comes from what appears to me to be logical objections, which are not weakened by the fact that I have failed to find clinical confirmation of them.

I am very glad to appear in the uncongenial role of a conservative, because it seems to me that certain important facts are being obscured by statements which are related to them merely by remote analogy. Let me illustrate what I mean. Recently I was told of what a very good man, and one whom I am proud to number among my personal friends, regards as a perfect example of remote effects from a local infection. The patient was a woman, admittedly an alcoholic, with a neuritis, such as has for years been regarded as due to alcohol, together with hallucinations. She had a pyorrhea of two incisors, due to a staphylococcus, with an infection of the opposite lip. The doctor regarded the neuritis as due to the pyorrhea rather than to the alcohol. This is, to my mind, an extreme example of the current mode to refer all sorts of ills to a focal infection, if one can be found. If none can be found, it is because insufficient search has been made.

There is also a disposition to forget that the idea that a focal infection can cause remote disturbances is an old idea. It antedates the days of bacteriology, and no one can have practiced medicine long without having seen numerous examples of the sort. Here belong most of the cases in which the relation between the local infection and the remote disease seems certain. Here one would include the cases of systemic surgical sepsis, in which a septicemia or a septico-pyemia follows a surgical procedure or an injury. For example, sepsis following an abortion or a compound fracture. Perhaps a better illustration would be a sepsis following some trivial injury, like a pin-prick.

The appearance of acute diffuse nephritis after an acute tonsilitis is a by no means unusual experience. Here the injury to the kidney may be due to microbic migration, or to toxins absorbed and excreted. The association of acute tonsilitis with acute articular rheumatism is now very generally admitted, although one sees numerous cases of acute multiple arthritis

where there has been no tonsillar infection. The probability of this association is strengthened by the exacerbation of the joint changes immediately after the removal of the tonsils. The association of tonsillitis and chorea is also generally admitted, and I recently saw a mild chorea made much worse for a few days by removing the tonsils. The association of acute endocarditis with tonsillitis and rheumatism is another which one must classify as certain. One cannot have much to do with children without seeing evidences of trouble in the appendix accompanying acute tonsillitis. This association is common, and has received particular attention from the French clinicians, who have contributed a considerable literature upon this subject. Acute pericarditis is another example of the same sort. Acute miliary tuberculosis is another instance of a systemic disease resulting from a focal infection. Syphilis is another.

The remote effects of a primarily local process may come about in two ways, either by migration of bacteria, sometimes through the lymph channels, but more often through the blood vessels or by means of toxic bodies locally produced and thence transported. As a well-marked example of the last, one may mention the multiple neuritis so frequently seen after diphtheria. It is probable that the myocarditis following this disease is also produced in the same way.

Chorea is probably another example of the effects of toxins rather than of bacteria.

As another toxic effect, one might mention the often severe anemia following tonsillitis and acute rheumatism.

Thus one may list as remote effects following a local infection general sepsis, with or without abscess formation; multiple arthritis, myocarditis, pericarditis, acute nephritis, appendicitis, multiple neuritis, chorea, endocarditis. There is, indeed, no organ in which localization remote from the infection atrium may not occur, and one could easily extend this list to include osteomyelitis, hepatitis, cholecystitis, gastric ulcer, brain abscess, etc., etc.

Diverse as these conditions are, they have one common characteristic, i. e., they are acute in their onset, although any of them may be chronic in their course, and some of them practically never heal without having permanent effects.

I take up the next group with some hesitation, for I feel by no means certain in regard to them. The list is, however, a short one. It seems to me highly probable that the general health of children with enlarged tonsils and adenoids is seriously impaired, even when there is no reason to think of any definite localization remote from the throat. The supply of oxygen is lessened by the narrowing of the air passages; possibly toxic materials which interfere with digestion are swallowed, and probably there are toxins absorbed which cause hemolysis. At any rate, the removal of the tonsils and adenoids in such children is followed by marked improvement in the general health.

It is probable that certain cases of urticaria are due to a focus of infection, although the number of these cases is not large. The same thing may be said of a small percentage of the cases of bronchial asthma.

To my mind, the most interesting and important phase of this question is the possible relation of chronic processes to focal infections. Are we justified in inferring that chronic arthritis, chronic nephritis, myocarditis, neuritis, myositis, anemia, etc., can be caused by persisting focal infections, just as their acute analogues result from acute foci of infection? This is really the question under discussion, for I think we can all agree about the relation in acute cases.

So far as I know, the first suggestion of a possible causal relation between a focus of infection and chronic arthritis was made about twenty years ago. Very little attention was given the matter, but gradually interest increased, and about ten years ago there was considerable literature, and many were inclined to the belief that there was such a relation, and particularly a relation between pyorrhea and tonsillar infections, and that rather heterogeneous group of arthritides which are called arthritis deformans. The subject then rather languished until a few years ago, when, under the powerful influence of Billings, aided by the work of Rosenow, interest became general, and the conviction spread that in focal infections we had a potent and widespread cause of a great variety of chronic ills. What the ultimate conclusion will be we do not know, but probably the truth lies somewhere between the extremes.

In this group of cases the commonest focus from which chronic processes are thought to arise is the pyorrhea and radicular abscesses. Other foci are possible, such as the tonsils, accessory sinuses of the nose, prostatic abscesses, chronically infected gall-bladders, and the like, but all of these are less frequent than the first mentioned, and tonight the subject of particular interest is the causal relation of pyorrhea.

The first objection to occur to one is that pyorrhea is so extremely common. The observant physician is perhaps more keenly appreciative of the great frequency of this disease than the dentists, because he sees it so often among people who give their teeth no attention, while the dentist sees only those people who have an interest in preserving their teeth. Take, for example, the many thousands of people who yearly pass through the County Hospital. To say that a majority of those over thirty will show more or less pyorrhea is certainly a conservative statement.

The more widely spread a condition is, the more difficult it becomes to establish an etiological relation between it and any given effect. If the incidence of a supposedly etiological factor is 50 per cent of the population, then its effects should be present in 50 per cent of the population. If, however, a cause is present in the majority of people and the effect is present in only a small percentage, the burden of proof becomes heavy, and one is justified in demanding more proof than would otherwise be required. I cannot say what the incidence of arthritis deformans is, but let us assume, for the sake of argument, that it occurs in 1 per cent of the people in the second half of life. We have, then, the effect in 1 per cent of a cause present in, shall we say, 50 per cent?

This consideration by no means excludes an etiological relation between the two processes, for it may be that the pyorrhea is merely the crystallizing factor.

Let me illustrate what I mean by the pneumococcus. The etiological relation of this organism to croupous pneumonia, now universally admitted, was questionable for a long time because of its ubiquity. It could be found much of the time in practically every throat culture, and it was only through the evolution of our methods of blood cultures that its etiological

relation to croupous pneumonia and a wide variety of clinical pictures was established. It may be that something of the same sort is true with the two conditions now under discussion.

Again, I wish to say that the burden of proof is heavy and one is justified in keeping an open mind upon the question.

The second most frequently suspected source of infection is the tonsil, and work along this line has shown that many tonsils which looked innocent and caused no local disturbances were nevertheless infected with streptococci. How frequently this is true of tonsils in people who show no remote effects cannot at present be said, but probably this information will come to us in time.

In what way can a chronic focal infection cause these remote changes? Only in two ways. Either by permitting repeated entrance of bacteria into the blood stream and thence transmission to remote parts, or by the absorption of toxins. Either of these is possible, but to both one can raise objections which are admittedly theoretical.

If the remote effects are due to bacteria, we must assume that the organisms at the point of entrance cause but little trouble, and yet they show by their effects elsewhere that they are capable of causing marked changes, or we must assume that because of the transmission or because of local conditions in the points to which they are transmitted they acquire activity. Furthermore, we must assume that they have selective powers, because we cannot suppose that they reach through the blood stream only those points where they become active. The possibility of such selective power cannot be denied, but it is a new idea, and must be very thoroughly tested out before it can be accepted. Furthermore, we must assume that these bacteria not only select the joints and periarticular tissues for their field of activity, but that in a considerable proportion of the cases they select symmetrical joints. Another example of symmetrical activity on the part of bacteria is not known to me.

Turning, now, to the other possibility, that the joint changes are due to toxins: We must assume that in spite of the minimum of local phenomena caused by the bacteria, they are, nevertheless, capable of forming toxic bodies, which are able to cause extensive changes over years of time. The objection to sym-

metry of effects is not so strong, for there are a number of other instances of selective symmetrical action of toxins; for example, the neuritis caused by lead and alcohol.

Another objection to the idea of focal infections as an etiological factor of arthritis deformans is that there are a certain number of cases in which no such focus can be found. To this it may be replied that nevertheless such a focus exists, and this is quite possible, for there are places enough for such a focus which cannot be reached by existing methods of examination.

To these theoretical objections let me add one more, which you may take for what it is worth. In the cases of this sort which have come to me since the possible importance of focal infections has been dwelt upon, I have searched for and removed such foci as I could find, without being able to see that the progress of the disease was altered in any way. When one recalls the multiplicity and diversity of the therapeutic agents employed in handling cases of this type, it is extremely difficult to say which of the agents is most valuable.

In closing, there is one other subject which I wish to mention, because, while not directly in line, it is closely allied, and that is the subject of vaccines. I have tried them faithfully and with such intelligence as I possess, and after some years of trial I am forced to the conclusion that they are useless.

30 North Michigan Boulevard.

THE SURGICAL TREATMENT OF PULP CANALS AS A PREVENTION OF SYSTEMIC DISTURBANCES.*

BY ELMER S. BEST, D. D. S., MINNEAPOLIS, MINN.

Mr. President, Members of the Chicago Dental Society, Ladies and Gentlemen:

In presenting this subject to you tonight I am thoroughly familiar with the fact that as a profession we are being held accountable for the somewhat disastrous results which have fol-

* Read before the Chicago Dental Society.

lowed the operation known to you as "pulp devitalization," and furthermore these results, at least in the majority of cases are not discovered by the general practitioner in dentistry, unless he makes or has made for him radiographic examination of his cases, but are being brought to the light of day by the radiographer at the request sometimes of the dentist but more frequently by the internist in his routine examination.

We have no difficulty whatever in detecting the symptoms associated with acute septic pericementitis. As a matter of fact they are speedily drawn to our attention by the suffering patient. Also we can easily detect the cases of chronic septic pericementitis with the sinus discharging orally. But as an aid in detecting those cases of septic pericementitis which have no apparent sinuses but which have been in existence for some time and have caused bone destruction, we must make use of the radiograph. There is to my knowledge no other means of determining their presence as to knowledge no other means of determining their presence and location. Their existence has such a vital bearing upon the health and even life of their host that their presence must be made known.

We are not therefore justified in saying that after we have removed the pulp of a tooth and filled the pulp canals that simply because we do not have the acute symptoms or the appearance of a sinus, the patient is having no trouble of which that particular tooth may be the cause.

In a recent examination of 169 cases which were submitted for radiographic examination of pulp canal operations nine were apparently well filled, as viewed from a mechanical standpoint, 160 imperfectly filled. Of the latter class 128 showed apical bone absorption, and 32 did not.

I will state at this time that we may easily have a case showing mechanically perfect root filling and yet have a large area of destroyed bone in the apical region. It may arise from any one of the following causes: Previous to the filling of the canal there may have been an abscess arising from this particular tooth, a curettment may have been performed, the bone may have been destroyed from chemical irritation as from arsenic, or in the removal of a vital pulp infection may have been introduced.

A clinical examination of the above mentioned cases showed a variety of conditions. In some the pulp tissue, presumably devital-

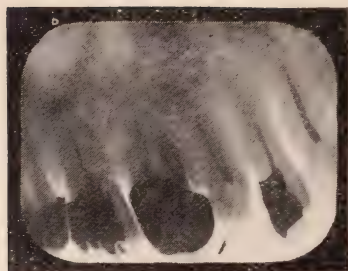


Fig. 1. Five consecutive teeth which have had pulps removed and the roots filled, all of them imperfectly.

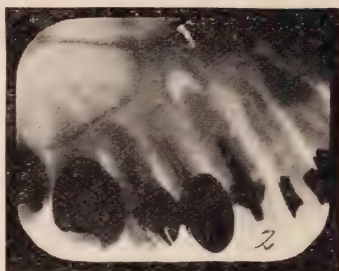


Fig. 2. Three pulpless teeth, cuspid noticeably involved.



Fig. 3. Upper central with pulp canal filled.

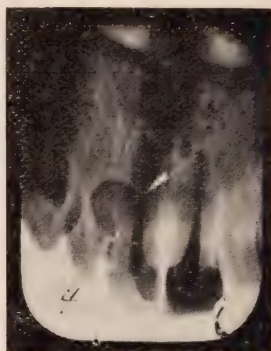


Fig. 4. Upper centrals with pulp canals filled.

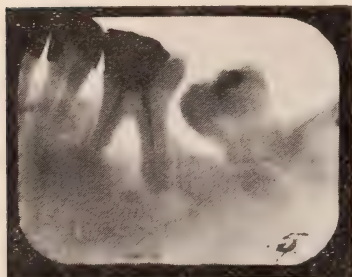


Fig. 5. First molar with mesial and distal roots imperfectly filled, also badly destroyed alveolar process.

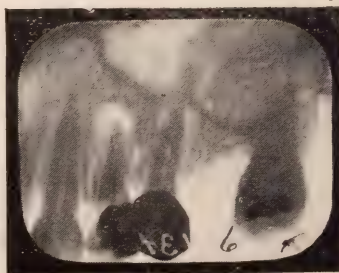


Fig. 6. Area of rarefaction over first bicuspid.

ized, had never been removed from the canals, apparently no attempt having been made in this direction. Some had the pulp tissue partly removed from the canals and various substitutes inserted. There were gutta percha cones, wires and many of the root canal pastes with which the market is flooded; while several again had the canals partly filled and between the termination of the filling and the apex vital pulp tissue was found. It is interesting to note that the latter cases showed no bone destruction in the radiograph and had all been indexed as cases of imperfect root canal operations from which no pathological conditions had arisen.

We have been placed under an everlasting obligation to the internists for drawing our attention to the vital relation that exists between the septic roots of teeth and systemic disturbances. I do not believe that they have in any way exaggerated the resulting conditions and my apprehension grows daily as I see some of the most alarming conditions disappear upon the removal of infected teeth which to the casual observer presented no evidence of the deadly effect they were exerting upon their host.

I realize full well that the progress which we are making in this field at present is due to the close co-operation between the doctor and the dentist. Together they are working out this problem in a way that is bound to be of inestimable value to mankind. My experience has been that when the difficulty of the pulp canal operation is explained to the physician they are very charitably inclined toward our former shortcomings and agree that the solution of the problem rests with the dentist in the improvement of our technic and the conditions under which the operation is performed. This improvement absolutely must take place, for there is every reason to assume that daily pulpless teeth are claiming as their own many victims and a new etiology for a variety of diseases is being found.

It is some years since we first had our attention drawn to the fact that sometimes the pulp of a tooth may become possessed of bacteria which may have entered by way of the blood stream. To quote from Burchard and Inglis, "In the first type of cases (that is, in teeth apparently sound) the bacteria may enter by way of the blood channels but it is not improbable that slight cracks or histological defects in the enamel may admit to the dentinal tubules the necessary bacteria or that they may gain entrance by way of the



Fig. 7. Lower bicuspid with canals filled.



Fig. 8. Lower bicuspid and molar with canals filled.



Fig. 9. Arsenical necrosis between centrals.

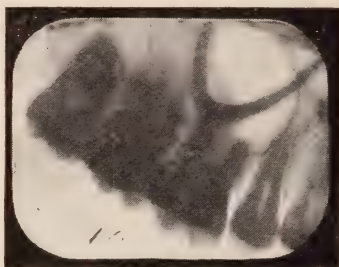


Fig. 10. Very large necrotic area over sound first molar.

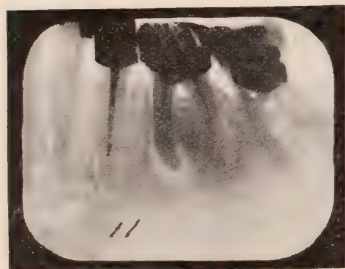


Fig. 11. Rarefied area around mesial root of first molar.

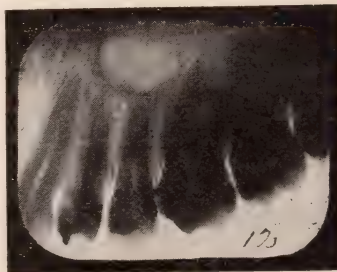


Fig. 12. Upper first bicuspid and first molar with pulp canals filled.

cementum and dentine at the neck of the tooth. The inference is similar in case of trimmed crowns of teeth underlying gold caps." Buckley has also drawn our attention to this possibility, and more recently Ulrich, who, however, carried it much further and states that in an examination of 1,000 cases he found 71% of the pulpless teeth had abscesses and further states it as his opinion that under favorable conditions all pulpless teeth will have apical abscess formation regardless of the quality of our pulp canal operation, because of the fact, as he claims, that such abscess formation is of secondary origin and becomes localized at the root tip because in devitalization we have created an area of lowered resistance which is an ideal spot for the proliferation of bacteria which are already in the blood stream.

The valuable information which I have received from the internist and bacteriologist with whom we do our work, together with my own personal observations, lead me to the belief that most of the infection which is found around the apices of pulpless teeth is of primary origin and is introduced through the pulp canal. We feel that we have sufficient evidence at present to indicate that the theory of secondary origin as applied to all pulpless teeth is not the correct one, though in pulp death it may be and probably is a big factor.

The results of experiments to date in those cases of periapical infection which we have examined have proven beyond a doubt that the same bacteria which we find in infected pulp canals are the active ones in the apical region. Now since it has been shown that we can not tell by radiographic examination alone whether or not the root canal has been well filled I will go one step further and say that in three cases of mechanically imperfect canal fillings (that is, imperfect so far as filling the canal laterally but perfect so far as reaching the apex is concerned) we found pyogenic bacteria in shreds of pulp tissue which had not been removed. These cases showed no rarefaction of the process. Also in cases of gangrenous pulps we were able to recover the same types of bacteria, viz., the streptococci and staphylococci which had not apparently invaded the apical area in sufficient quantities to cause rarefaction. But in every case where the bacteria of the above mentioned types were found in both the root canal and beyond the root apex they were found to be the same germ.



Fig. 13. Bicuspid root apparently filled to the end but contained non-vital pulp tissue which contained pyogenic bacteria.

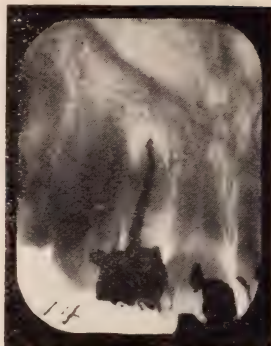


Fig. 14. Infected area with bone destruction over lateral incisor. Tooth had gangrenous pulp which was removed and canal filled. Radiograph taken before curettment.



Fig. 15. Radiograph showing one side of the upper and lower jaws without having the other side in the field under observation. Infected area over upper second bicuspid. Mental foramen shows at apex of lower second bicuspid.

A close analysis of the situation had led me to the belief that in these cases of root infection we have reaped a just harvest for the seed we have sown. In other words, I am convinced that the incubating of bacteria in the human system by leaving non-vital pulp tissue in the root canals and then placing the mischief-making bacteria in the canals in apposition with such tissue by allowing the saliva to enter the canals, carrying with it its army of bacteria, or by the use of dirty chip blowers, unsterilized pulp canal instruments or unclean cotton is a practice which none of my hearers will tolerate.

A recent examination of chip blowers and canal broaches which had been used showed that of 26 cases examined we found 15 contaminated with pus producing organisms.

Bearing in mind the fact that in the removal of a pulp which is possessed of vitality we are dealing with an open wound, small though it may be, we must at least use ordinary precautions which have been established by the surgeon in his work. What I have to offer you tonight I can not say is entirely original with me; much of it is not. Neither is it the only means of accomplishing the desired result.

The first suggestion which I shall offer is that an essential part of each equipment should be a dressing sterilizer for the sterilizing of gauze, cotton pellets, cotton wrapped on bristles for applying drugs or removing moisture, also for cotton points used for the same purpose. The wrapping of a large number of bristles with cotton and then subjecting them to the sterilizing process instead of wrapping each one as needed with a possible chance of contamination needs only to be mentioned to be appreciated by all. One feature of this work which presented some difficulty was that when these bristles which are mounted in aluminum handles were sterilized by steam the cotton came out stained with rust. This was eliminated by having the bristles plated with gold. Instead of using any of the waste cotton receivers at present on the market I am using small white porcelain waste dressing cups which can be thoroughly cleaned and sterilized after each patient. Gutta percha points are kept immersed in alcohol, the heads of the cones flattened to facilitate handling with pliers.

Another idea which I would like to draw your attention to is the transillumination of roots as an aid in our work. This is accom-



Fig. A1. Gangrenous pulp in second bicuspid.

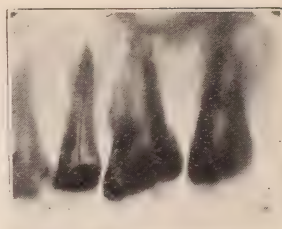


Fig. A2. Measurement wire.

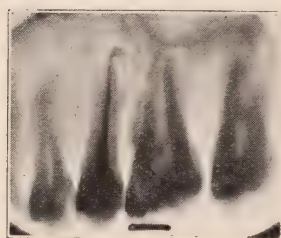


Fig. A3. Canal filled.

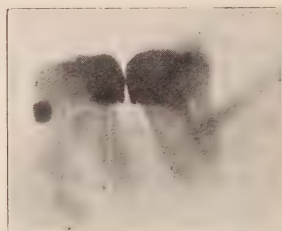


Fig. B1. Imperfect pulp canal filling in second molar.



Fig. B2. Measurement wires.



Fig. B3. Pulp canal filling not reaching apex (first attempt).



Fig. B4. Pulp canal filling not reaching apex (second attempt).



Fig. B5. Pulp canal filling reaching the apex (third attempt).

plished by means of the Dowling Transilluminator. It will be found that with the use of this lamp, which is what is called a cold lamp, that the interior of the roots are so illuminated that it is of the greatest aid in opening up the canals.

And now to dwell for a few moments on the *modus operandi* of this work. Of course, it would be quite out of place in this paper to give you all the varieties in connection with this work, even if I were able to do so, hence I shall simply outline the handling of a very fine canal, the kind which two years ago I would have concluded before opening into it was full of secondary dentin, the root must be very crooked and for several other reasons it would be quite impossible for me to open it up and fill it properly.

I first want a carefully taken radiograph in order that I may know some of the difficulties with which I will have to contend. I will say at this time that there is as much difference in radiographs as there is in pulp canal operations, gold inlays or any other operation.

Now we spray the mouth, dry the gums where the dam is to be adjusted and paint them with iodine, not forgetting the free margin. Next apply the rubber dam, for I feel that we simply must have this protection. It is our practice to use a dam holder which can be effectively sterilized. Now with the rubber dam in place and the saliva ejector working, we may commence operations. First paint the crown of the tooth and the surrounding rubber with iodine followed by alcohol. We will now assume that we are working under conductive or interosseous anesthesia. Opening the crown of the tooth liberally so that good access can be secured for each canal we select a very fine and very stiff bristle and pass it cautiously into one of the fine canals. Keep in mind that at this particular stage of the operation we can quite easily spoil our chance of completing this operation without greatly increasing our labor, by clogging this fine canal. If the bristle seems to pass without too much coaxing to approximately the apex it can be removed and dipped in sodium-potassium and replaced in the canal. This can be repeated until the pulp tissue in the canal has been digested. In case it has been very difficult to make progress in the canal but after much diligence we have reached the apical region, do not remove the bristle but place a drop of 50% sulphuric acid around the broach and by a circular movement work the acid along the broach. Many

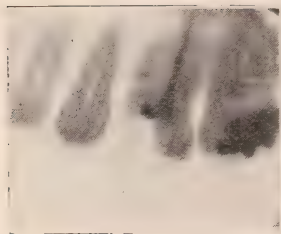


Fig. C1. Imperfect canal filling in upper first molar.

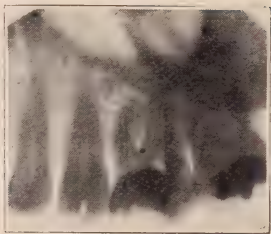


Fig. C2. Measurement wires.

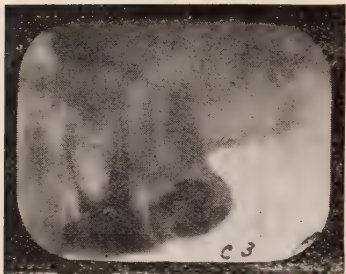


Fig. C3. Mesio-buccal canal not quite filled.

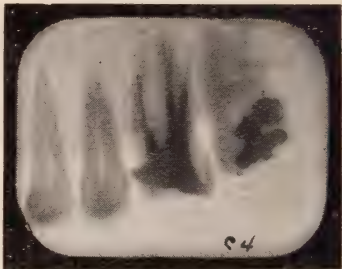


Fig. C4. All canals filled.

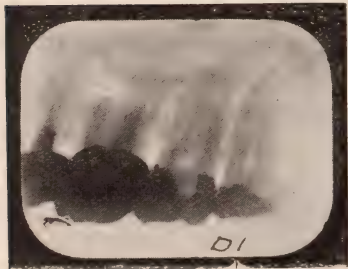


Fig. D1. Imperfect canal fillings in bicuspid and molar, mesio-buccal root of molar shows apical involvement associated with empyema of the antrum.

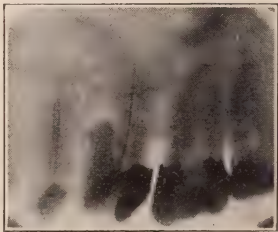


Fig. D2. Measurement wires.

times I have found that canals can be efficiently started in this manner. In these very minute canals it is of course out of the question to remove the pulp with barbed broaches, but it can be efficiently destroyed with the chemicals which I have mentioned. Next file down the canal walls with minute files made by rubbing the bristles between two flat gold files. Then use the spiral broaches of the ordinary type for enlarging the canal towards the apex. Commence with the very finest and after each one has been used follow with one of the same size but which has a much closer thread. This one used as a file will surprise one with the rapidity with which it will file down a canal wall. I have found them to be the most efficient instrument I have for this purpose. When I feel that we have reached the apex a measurement wire which I have had made in sizes of $\frac{1}{2}$, $\frac{3}{4}$ and 1 inch is placed in the canal. These wires are so constructed that the portion of the wire projecting from the canal is annealed and can be bent through a groove which has been cut in the cavity margin just over the opening into the canal. The cavity is sealed and rayed. If the wire has reached the apex we are nearly through, but if it has not, we take the radiograph and placing the bristle on it, measure on the bristle the distance from the root apex to the point where the wire bends. The distance is indicated by a small drop of sticky wax on the bristle. In the mouth this gives us the distance from the groove which has been cut in the margin of the cavity to the root apex and from now on we can tell with accuracy how far we are from the end of the root. The filling of the canal I shall not presume to describe further than to say that I am using the excellent method which Dr. Callahan has given the profession. When the roots have been filled they are again rayed and if we have not succeeded in reaching the apex the gutta percha is dissolved with Xylol and removed and the canal is refilled. The orifice of the canal is sealed with oxychlorid of zinc cement.

It might appear from the foregoing that I am in favor of the practice of removing a large percentage of pulps, so I shall briefly state my views on this subject. It is my practice to save every pulp that I possibly can with comfort to the patient and assurance of health to the pulp. There are however certain forms of attachments for bridge work and certain diseased conditions of the pulp that require its removal, and my position is simply that we should



Fig. D3. Disto-buccal and lingual roots of molar also bicuspid filled. Mesio-buccal root of molar amputated, this greatly assisted in clearing up the antrum.



Fig. E1. Imperfect canal filling in first bicuspid.

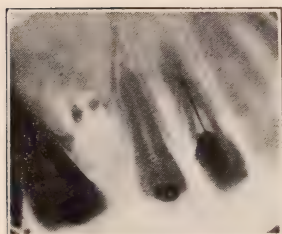


Fig. E2. Measurement wires.

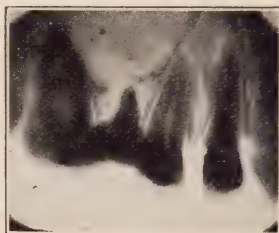


Fig. E3. Root filled.

be prepared to do this operation efficiently when called upon. I am firmly of the belief that the improved methods of preventing pain in cavity preparation have done as much to solve the problem of defective root canal operations as any technic improvement. To my mind there have been more pulps removed from a desire to alleviate pain in the preparation of cavities than from any other cause.

In closing I shall briefly refer to a subject which seems to have created some little discussion during the past year. Unquestionably the radiograph is of inestimable value and assistance to us but there is a phase of this subject that may be overlooked. When something new is presented for our use and we have mastered the technic we are apt to feel that it is a cure-all and will displace all other methods which have been used formerly. To my mind there is a possibility of doing this with radiography in dentistry and we must guard against it carefully. Radiographic evidence supported

by clinical and bacteriological evidence all of which has been carefully and thoughtfully worked out is almost infallible. But in many cases any one of these used singly to my mind is liable to be fallible. Therefore while I am a strong advocate of radiography and could not do my work without its assistance, yet I would urge upon you all other methods of merit so that by their combined use we may render the greatest possible service to our patients.

I herewith submit the bacteriologist's report on twenty-one cases:

Case	How grown	Growth	Particulars
128	Anaerobically	Strep. Viridans	Secured growth from canal which contained a root canal paste. In contact with paste was non-vital pulp tissue.
93	Anaerobically	Strep. Viridans	Pulp was gangrenous. Formo-cresol dressings used and root filled. Curettment of necrotic periapical area yielded good growth but root tip did not.
197	Anaerobically	Streptococcus	Pulp was gangrenous. Formo-cresol dressings used as in case 93. The same germ was recovered from the pulp, the abscess sac, and in the root tip upon its removal.
199	Anaerobically	Streptococcus (Very long chains)	In root canal and periapical area.
217	Anaerobically	Streptococcus	Pulp was gangrenous. Same germ from pulp canal as from socket upon extraction.
193	Anaerobically and Aerobically	Streptococcus and Staphylococcus	Non-vital tissue in the pulp canals, partly filled with pulp canal paste. Same germ in periapical area as in canal.
184	Anaerobically	Streptococcus	Copper wires in pulp canals. Contained some non-vital pulp tissue.
236	Anaerobically	Streptococcus	Pulp gangrenous. Guinea pig inoculated with 24 hours' growth died in 48 hours.
221	Anaerobically	Streptococcus and Bacillus Pyocyaneus	Non-vital tissue in the pulp canals which were partly filled with gutta percha.
3	Anaerobically	Streptococcus	Pulp gangrenous.
3	No Growth	Cotton which had been in canal 48 hours and contained formo-cresol.
3	Anaerobically	Streptococcus	Growth secured from non-vital tissue (gangrenous) which was in apex.

Case	How grown	Growth	Particulars
170	Aerobically	Staph. Aureus	Upper left six with no cavity and no fillings. Extraction showed large necrotic area but which did not yield streptococcus. Apical half of ling. canal pulp was gangrenous but the remainder was vital. Same germ in canal as in periapical area.
157.	No Growth	Radiograph showed large area of rarefaction but neither tooth nor socket yielded growth.
108	Aerobically	Staph. Aureus	Non-vital tissue in canal partly filled with gutta percha cones.
198	Anaerobically	Streptococcus	Non-vital pulp tissue in canals which were partly filled with gutta percha cones. Same germ found in socket as in canal.
67	Aerobically	Staph. Aureus	Non-vital pulp tissue in canal which had a gutta percha cone extending to apex of root.
61	Anaerobically	Streptococcus	Growth secured from the periapical area.
139	Anaerobically	Streptococcus	Non-vital pulp tissue in canals of two teeth, both of which contained iodoform paste.
212	No Growth	Necrotic area from arsenic.
237	Anaerobically and Aerobically	Streptococcus and Staphylococcus	The canals of this tooth were well filled with Oxy-chlorid of zinc cement and the tooth gave no growth but the large necrotic area gave the two forms of bacteria.

Note.—For valuable assistance in supplying material for this report I am indebted to Dr. E. A. Woodworth, Bacteriologist.

THE LATEST PRACTICAL ATTACHMENT.*

BY DR. H. F. MERCK, BELLEVILLE, ILL.

There are a few words necessary before showing the models I have here in regard to the use and construction of the Bischof-Otrich Attachment for full and partial dentures and also what is called removable vulcanite bridge work.

I am particularly interested in this attachment, primarily because it appeals to me as being the best attachment we, as dentists, have at our command, and secondly, because it is the invention of my colleagues and friends, Doctors Bischof and Otrich.

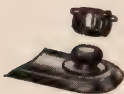
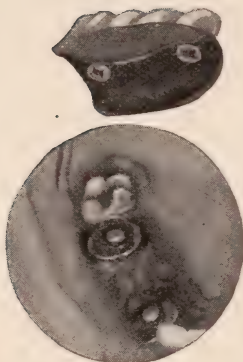
After very little explanation and after you have examined the models, I am sure you will think of many cases for its use. The B.-O. Attachment consists of two parts, the ball and the clasp. These are constructed of the best grade clasp metal. The metal used in the ball is alloyed with another metal to produce hardness slightly in excess of the clasp. This is done for this reason: That in years of use, should one of the parts wear, it is naturally better to have the clasp show wear than the ball, for the clasp can be easily adjusted or removed if necessary, while the ball cannot, as it is soldered permanently to a coping which is cemented to the root of the tooth, as shown in Figure 1 and Figure 2.

You will notice that the ball is round and flat, graduating down at its neck and flanging out into the formation of a flat base, which can easily be soldered to the top of any coping. The clasp is made of 28-gauge clasp metal, consisting of four pedals and four retaining flanges, as shown in Figure 3.

This attachment is so constructed that when brought together and the clasp slipped down over the ball, it must have perfect contact, that is, the base of pedals must come in contact with the base of the ball, which adjustment is a factor in preventing the denture rocking in the mouth.

The four retaining flanges are very prominent and are held firmly in position by the rubber. In the event of these flanges

*Read before the Southern Illinois Dental Society.



interfering in the arrangement of the teeth, etc., they can easily be shortened by a few strokes of the file.

The method of employing this attachment is very simple. Trim root below the free margin of gum and proceed as for a Richmond crown, soldering the post to diaphragm with or without band. Then solder the base of the ball to the diaphragm, always toward the lingual, not to conflict with a short bite. Place in position, take impression, and pour the impression with coping in position. After occlusion is secured and models are mounted on an articulator, place the clasps in position over the ball, place a small strip of unvulcanizable rubber around the clasp and proceed as with any other rubber denture.

After the case is finished, cement the coping to root and the denture will snap firmly to place. The tightness of the plate can be regulated by expanding or bringing together the flanges.

This attachment eliminates the pathological changes such as congestion of the surrounding gum tissues, hypertrophy of the gum, etc. It also prevents the loosening of the abutments or splitting of the root as the stress is directed with the long axis of the root.

I have also a couple of cases showing the employment of the attachment.

The teeth to be used for the abutments in these cases were in almost perfect condition and I did not wish to sacrifice them, so prepared the teeth and crowned them. After crowning, made a saddle and adapted it to the ridge and soldered to crown. The most important point to bear in mind in this class of cases is the adaptation of saddle. The crown should fit well around the neck of the tooth, below the gingivus, and then the saddle adapted to the crown on a line with the gingival margin, because if the saddle is too near the base of the crown there will be pressure on the gingivus and atrophic changes take place in the gum due to pressure, and then the secretion will come in contact with the cement and thus produce its disintegration, and also further pathological changes of the surrounding tissue.

In any case where an attachment is applicable the dentist need have no hesitancy using this one.

The strength in this case is as great as is possibly attainable, the distribution of the force used in removing or adjusting the

denture being distributed over about three-fifths of the crown surface and with the added strength obtained by the close proximity of the denture around the crown it brings the strength to the highest.

In conclusion I want to give a word of warning, so that the proper caution will be used in the selection of mechanical devices which are used in the mouth. You know that any foreign body in the mouth acts as an irritant to a certain extent, and constant irritation to any given point brings about a pathological change and if kept up for a long period of time is liable to produce a malignancy. So, therefore, be cautious in your selection of all mechanical appliances, so that no part is so exposed as to cause an irritation.

ENAMEL, CARIES AND IMMUNITY.*†

BY C. F. BÖDECKER, D. D. S., BERLIN.

REPORT OF THE MICROSCOPIST.

The etiology of caries has been the subject of many investigations as this disease is so widely prevalent and so destructive in its effects. As we all know, Miller was foremost in this field of research and we owe to his genius the discovery of the cause of caries. When Miller made his first discoveries, the dental profession was very optimistic and hoped they would at last be able to control dental caries. The axiom: "Clean teeth do not decay" passed around the world and finally was refuted by the condition of many a clean tooth. Of course, there is no doubt that if a mouth could be kept sterile and in an alkaline condition, the teeth would not be affected by caries. Therefore, it is not wise to discourage a patient in keeping his mouth as clean as is humanly possible. On the other hand, we all know that other factors beside cleanliness, play an important part in caries of the teeth. The study of the pathological conditions of the body proves, that, though

* Read before the American Dental Society of Europe, 1914.

† Dr. Bödecker used illustrations in his article, but up to the time of going to press it has been impossible to get them from Europe. We are, therefore, much to our regret, obliged to publish the paper without them.—*Editor*.

the exciting cause of a certain disease may be present, the body will remain healthy until affected by a predisposing cause. This is analogous to caries for we frequently find an excessively uncleanly mouth with no traces of decay. The only predisposing cause of caries, generally admitted, is irregularities of the teeth favoring an undue accumulation of food. Certain cases observed by all of us in practice, prove that the accumulation of food alone, will not cause decay. Frequently extensive caries destroys the proximal surface of one tooth, whereas the adjoining surface of the next tooth remains intact, or is at the most only discolored. Why does the lactic acid, formed by the decomposition of food, lodged between the two teeth, attack one tooth and not the other? The answer to this riddle is, that one tooth is predisposed to caries, while the other is immune. In other words, the enamel of one tooth, owing to a different histological structure, is more resistant to lactic acid than the other. This difference has long been characterized by clinicians as hard and soft enamel. If immunity and predisposition to caries is so marked in two adjoining teeth of the same mouth, how much greater must the difference be, in two individuals in different states of health? All practitioners have noticed that certain constitutional disturbances have a deteriorating effect upon the teeth. It is the object of this paper to show to what degree some diseases of the body may influence the development, structure and the calcification of the teeth and bones.

The organs which most markedly affect the calcification of teeth and bones are the ductless glands. Twenty-five years ago, little was known about these organs and less about their function. The glands now known to be intimately connected with the growth of the bones and teeth are the thyroid, parathyroid, thymus, pituitary body and even the ovaries and testes. A disturbance in the proper function of any of these organs, causes a diminution in the amount of calcium salts deposited in the hard tissues.

The diseases which were commonly thought to cause extensive faulty development of the teeth are syphilis, rachitis and cretinism. The past tense is purposely used as Hochsinger (1) and Neuman (2) have proven that syphilis rarely causes dental disturbances. It is therefore wise for us to discard the old theory of Hutchinson (3) that faulty enamel development is necessarily of syphilitic origin.

Fleischmann (4) denies that rachitis has the usually ascribed effects upon the development of the teeth. He proves that this disease, though having a deleterious effect upon the development of the dentin, does not interfere with the calcification of the enamel. His arguments are as follows:

Firstly—Rachitis is a common disease, occurring in 60 to 90 per cent of cases, whereas hypoplasia of enamel is met with in only 2 to 7 per cent. The percentage of faulty calcification of the dentin in cases of rachitis is however very much greater.

Secondly—Rachitis is most acute at the end of the second and in the third year of childhood, whereas the faulty enamel is usually found in those parts of the teeth, which develop at the end of the first and the beginning of the second year.

Thirdly—Faulty and sound enamel frequently alternate, proving that the disturbing factor is intermittent, which is not characteristic of rachitis. For these reasons Fleischmann denies rachitis to be the cause of faulty development of the enamel, and attributes this phenomenon to a disturbance of function of some of the ductless glands.

Kranz (5) has collected extensive material and also performed some experimental work upon animals concerning the effect of the ductless glands upon the bones and teeth. Most of the following photographs are copies from his publication.

Cretinism is characterized by the absence of the thyroid gland. Figure 3 is a photograph of the skull of a cretin showing so-called rachitis teeth. The faulty enamel development extends from the anterior teeth back to the third molar.

Figure 4 is a reproduction of a mandible of a cretin thirty-one years old, showing excessive irregularities. The number of teeth also are far above the normal, there being nineteen present.

Just as the congenital absence of the thyroid gland in cretinism causes deformities in the bones and teeth, so can similar changes be artificially reproduced in animals by the surgical removal of the gland. Fleischmann has even produced a hypoplasia of the enamel after the removal of the parathyroid of animals, similar to that found in human teeth.

Figure 5 shows the photograph of three skulls of pigs, the right being a control animal aged four weeks, while the left is another control aged six weeks. In the specimen shown in the

middle, the thyroid was removed at the age of two weeks and the animal died at the age of twelve weeks. Although twice the age of the specimen on the left, it is considerably smaller and still retains some of its temporary teeth.

As soon as the fact was established that cretins are born without the thyroid gland, these children were fed on a thyroid extract in order to substitute what nature had omitted. Figure 6 shows the advantage gained by this treatment.

Myxedema, also a disease affecting the thyroid gland, has been successfully treated with thyroid extract. Figure 7 shows a skiagram of a hand of a girl, thirteen years old, suffering from this disease. We note that the ends of the metacarpals and phalanges are missing, while the carpals are entirely absent. After about a year's treatment with thyroid extract the bones became thoroughly calcified and normal as seen in Figure 8.

The removal of the parathyroid or epithelial bodies seem to have a similar effect upon the teeth as a diseased condition or the removal of the thyroid. Figure 9 shows a photograph of a rat from which the parathyroid had been removed. After a certain time the enamel of the incisors, which have persistent pulps, developed pits and these teeth deteriorated so that they fractured in ordinary use. The removal of the parathyroid does not seem to affect the animals as seriously as the removal of the thyroid, but they die from lack of proper nourishment soon after the incisors are fractured.

The function of the thymus is also intimately connected with dentition. Figure 10 is a photograph of a child five and a half years old, born without a thymus gland, who spontaneously lost all temporary teeth at the age of four years. The position of the thighs also shows an abnormal condition of the joints.

The removal of the thymus does not have a direct effect on the size of the bones, but it markedly retards the progress of dentition. Figure 11 shows the mandibles of two dogs, the right ones are from the control animal, while the left ones are taken from the operated dog which still retains several of the temporary teeth.

The pituitary body or hypophysis cerebri, however exerts a marked influence upon the size of the bones, as can be seen in Figure 12.

Figure 13 also demonstrates the effect of the removal of the pituitary body. But not only does this organ have an effect on the size of the bone, but it also in common with other ductless glands influences the progress of dentition.

Figure 14 is a skiagram of the mandibles of two dogs of the same litter, in which we notice that the mandible of the operated dog is smaller and still retains a temporary tooth.

Even the ovaries and testes seem to influence the development of the teeth. Kranz took comparative measurements of normal and castrated pigs, aged twelve months and found that the length of a superior cuspid of a normal animal was 13.2 millimeters, whereas in the operated one, it only measured 7.2 millimeters, showing a decrease of almost one-half. These measurements prove, that the testes affect the teeth, therefore, it does not seem improbable to ascribe a similar function to the ovaries, as they are, in all respects analogous to the testes. This furnishes the basis of a reasonable explanation of the long noted fact, that during pregnancy, the teeth of the mother become more liable to decay. As the ovaries suspend their normal function for a time, their influence upon the teeth is diminished, in consequence of which the latter may deteriorate.

The study of the ductless glands has conclusively proven that a pathological condition of any of these organs, causes a disturbance in the calcification of the teeth. The enamel is, of course, the principal tissue protecting the tooth against caries, therefore an abnormally calcified enamel will be predisposed to caries. Black has been unable to prove any difference in the quantities of calcium salts of so-called hard and soft teeth. Yet to my mind a difference does exist, though so slight that it is difficult to determine chemically. Pick-erill, on the other hand, has been able to discover a difference in "hard" and "soft" teeth which he calls malacotic and sclerotic respectively. We can therefore class the teeth of our patients into two groups, those immune and those predisposed to caries. As we have seen the immense benefit the body as a whole, derived from thyroid extract in pathological conditions of the thyroid gland, there is every reason to believe that the teeth of such cases also are improved by this treatment. I believe the time will come when the exact function of each of the ductless glands will be recognized, and a means of diagnosing the condition of each gland will be found. I even go further, gentlemen and claim that then the

development and calcification of the teeth will be improved by treatment with extract of that gland which is deficient in any given case. The fact that a patient may become temporarily more disposed to caries as in pregnancy or serious illness, is a proof to me that some organs in the body have a life-long influence upon the welfare of the teeth. Before this question can be decided, however, the true cause of sclerotic or "soft" teeth will have to be discovered. If it is purely a lack of calcium salts, the stimulation of the ductless glands will probably effect an improvement, but a second factor may possibly influence predisposition to caries and that is, improper nutrition of the dental tissues. This question, however, is beyond the scope of this paper.

Kranz has made some histological examinations of the teeth of his experimental animals, but found nothing abnormal. I am, nevertheless convinced that pathological conditions do exist in such teeth. Before these can be recognized, however, more work will have to be done on the minute structure of enamel and dentin. Most of us imagine that the structure of these tissues is like an open book, but I believe that we are only at the beginning. Six years ago, it was doubted, for instance, that enamel contained an appreciable amount of organic matter. Since then I have furnished absolute proof that it does contain a considerable amount and I am convinced that this organic matrix plays an important part in the nutrition of the enamel. I do not believe that the body can permanently retain any dead tissue. Advances have also been made in the study of the histological structure of the dentin. At the Sixth International Dental Congress, I expect to read a paper, showing that Tomes fibre is not solid but is in the form of a tube, through which the nutritive fluids can pass to the enamel.

To sum up, gentlemen:

First—The predisposition of teeth to caries varies in different individuals and therefore so-called "hard" and "soft" teeth do exist.

Second—Whether an individual has "hard" or "soft" teeth depends upon the health of the person.

Third—Local immunity to caries may be explained as follows: The development of crowns of the permanent teeth extends from the first to the ninth year (not counting the third molar). If at any time disturbances of any of the ductless glands occur, the teeth developed at that time will not be properly calcified and will be

disposed to caries. When health is restored, the other teeth develop normally and are immune to caries.

Four—According to the state of our present knowledge, the ductless glands exert the greatest influence upon size, development and calcification of the teeth and bones.

Five—Pathological changes or the removal of any of the above mentioned glands, cause a diminution in the amount of calcium salts deposited in the bones and teeth.

Six—If the surgical removal of these glands cause such an ill effect upon the teeth, I am confident that means will finally be found, to stimulate the glands in question, so as to perfect the calcification in cases of so-called "soft" teeth.

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CASE OF ORTHODONTIA BY PHOTOGRAPHS.*

BY DR. GORDON WHITE, NASHVILLE, TENN.



FIG. 1.

The patient as she presented herself at the age of 35 years. The jaws are in occlusion.



FIG. 2.

The model of the case when first taken represents the teeth as they appeared, striking three on each side, some of which barely touched, the lower incisors striking a quarter of an inch in front of the upper ones.

*Presented to the American Dental Society of Europe, July, 1914.



FIG. 3.

This shows the front of the same models. Notice how far up the lower incisors strike in front of the upper ones.



FIG. 4.

This model indicates the contraction of the upper arch.



FIG. 5.

The case after fifty days' treatment.



FIG. 6.

The upper model of last figure. At this point patient goes away for two years, when the case is taken up again and the teeth brought together again and bicuspid replaced on upper plate in the place where it had been extracted at the age of 14. Figs. 7 and 8 show the results.

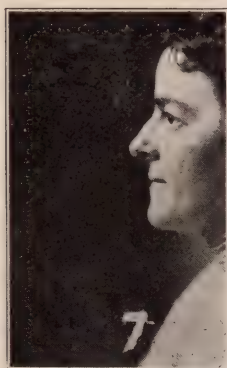


FIG. 7.

After seventy days from Figs. 5 and 6.

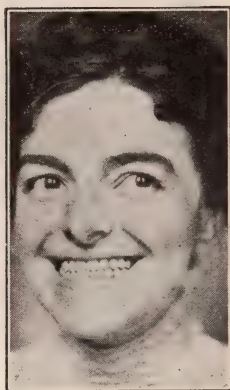


FIG. 8.

Same as Fig. 7. Front view showing plate and bicuspid in place. Age, 37½. She's happy.

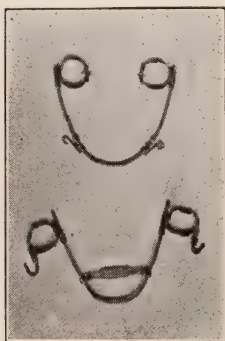


FIG. 9.

Showing the main appliance with which the work was done.

HYDROLYSIS OF TRIACETYLGLUCOSE BY ENZYMES.*

BY S. F. ACREE AND J. E. HINKINS.

In a previous article¹ we showed that some bacteria, especially *Bacillus acidi lactici* and *B. sarcina lutea*, when in culture media containing glucose, lactose, etc., generate organic acids, and, furthermore, have the property of causing these organic acids to combine with the sugar to form esters. It was found that, although the bacteria continued to produce acids, the free acid did not increase in quantity, but by titrating the free acid in the cold and then boiling this neutral solution for a short time, more free acid was generated. Hence we quickly guessed that the bacteria, or possibly enzyme like bodies excreted from them, were causing a part of the free acid to combine with the glucose to form glucose esters which, in the cold, were not rapidly saponified by sodium hydroxide, but which, by boiling, were hydrolyzed by the hot water. Hence the amount of the acid combined as ester was determined by titration with N/10 sodium hydroxide after the hydrolysis. Such hydrolysis of ordinary esters or even more complex ones² is so well known that it needs no further comment.

Under the conditions of our experiments it was impossible to tell whether the bacteria hydrolyze the glucose esters, as well as cause their formation from glucose and free acids. We afterwards took up this work again with the view of ascertaining if such a reversible process can be realized. Since triacetylglucose can be easily made, and since enzymes, such as pancreatin, emulsin, and diastase can be easily obtained in the market, we began the work by the study of the action of the enzymes on triacetylglucose. We have found that enzymes hydrolyze triacetylglucose into acetic acid and glucose. Furthermore, what few experiments we have carried out in this direction show that the enzymes can also make acetic acid unite with glucose to form esters,—in other words, we have here a reversible process that can be repre-

* Read before the Odontological Society of Chicago, January 12, 1915.

¹ Read before the International Dental Congress, Paris, Aug. 8, 1900. Dental Cosmos, June, 1901.

² Acree: This Journal, 27, 132; Ber. d. chem. Ges., 35, 553.

sented as follows when we consider only the formation and hydrolysis of monoacetylglucose, which is, of course, the simplest ester that can be formed by the action of acetic acid on glucose.



One very important reason for starting first with the action of enzymes (not bacteria) on triacetylglucose is that the enzymes do not act upon the products of hydrolysis namely, glucose and acetic acid, and hence the determination of the amount of hydrolysis is very simple.

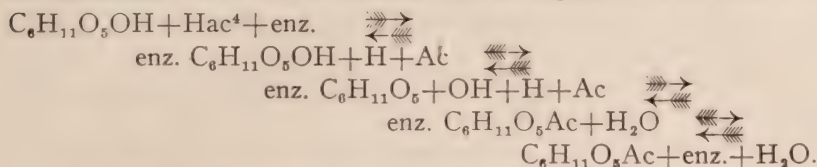
When a sterilized solution containing 20 grams of glucose and 5 cc. of glacial acetic acid in 1 liter, which was N/11.51 acid, was closed and allowed to stand at a constant temperature of 37° C. for thirty days there was no fermentation, nor was there any change in the strength of the acid, as it was shown by titration at the end of this time to have exactly the same strength, N/11.51. This same was also true for a part of this solution diluted about three and a half times, so that it was N/37.35 acid. Furthermore, when a 3.2 per cent solution of triacetylglucose, which titrated N/42.44 acid, was left at 0° C. for thirteen days, and kept sterile by means of toluene and thymol, there was no hydrolysis by the water, for titration showed at the end that it was N/42.50. A faintly acid solution of pancreatin was allowed to stand for ten days, but no change in acidity took place. Hence we are very sure that if any changes take place according to the above equation, the enzyme must take part in the reaction or act as a catalytic agent. Hufner,¹ Loew,² Nasse,³ and others, have given us theories to account for the action of ferments, but none are well worked out experimentally. Nasse's hypothesis might be restated as follows: Glucose gives no hydroxyl ions, and hence dilute acetic acid does not act upon it. Suppose that pancreatin has the power to unite with glucose, and that in this double compound the hydroxyl groups of the glucose become hydroxyl ions; then the ionized acetic acid can act upon this double compound, forming water and the double compound, enzyme-acetylglucose, which may break up into the enzyme and acetylglucose. The enzyme which is thus regenerated may then act upon another molecule of glucose (or the acetylglucose), causing other hydroxyl groups to be changed to hydroxyl ions, and hence the pro-

¹ Hufner: J. prakt. Chem., N. F., 10, 385 (1874).

² Loew: *Ibid.*, 11, 372 (1875); Pflüg. Archiv., 27.

³ Nasse: Maly's Jb., 1894, 718.

cess is repeated. If we assume all the above reactions to be reversible, then the hydrolysis of acetylglucose, for instance, would be incomplete. But if some steps in the reaction are non-reversible or practically so, then we might have the reaction going completely in one direction. The entire reaction can be represented as follows:



Nasse's hypothesis, however, as applied in the above form, does not easily give us an explanation of the oxidation and reduction reactions accomplished by bacteria and enzymes.

If we look through the literature on enzymes, we find isolated cases where enzymes cause the hydrolysis of substances similar to the above. Probably the best piece of work done was published by Kastle and Loevenhart.¹ They showed that lipase hydrolyzes ethyl butyrate into alcohol and butyric acid, and, further, that lipase is capable of effecting the synthesis of ethyl butyrate from butyric acid and ethyl alcohol; that is, the action of lipase is reversible. Baas² found that methyl, phenyl, and ethyl salicylates are hydrolyzed in the intestines of a dog. Schmiedeberg³ showed that histozyme can hydrolyze hippuric acid into benzoic acid and glycocoll, and Niencki⁴ showed that pancreas effects the same hydrolysis.

The triacetylglucose used in this work was made as follows:⁵ Forty grams of crystallized glucose and 100 grams of acetic anhydride were mixed in a flask and heated to 100° C. Most of the glucose went into solution immediately, but an oil was left at the bottom. This was soon acted upon by the acetic anhydride, and so violently that the flask had to be cooled to avoid boiling over. Upon warming on the water-bath for three hours, the liquid had assumed a brownish color. This was poured into water in an evaporating dish, and was evaporated to a syrup, then diluted and again evaporated to a syrup. This syrup was shaken out with benzene in a

⁴ Ac = CH₃CO₂—; enz. = enzyme.

¹ This Journal, 24, 491.

² Ztschr. physiol. Chem., 14, 416 (1890).

³ Arch. f. exper. Path. u. Pharm., 14, 379 (1881).

⁴ *Ibid.*, 20, 367 (1886).

⁵ Schützenberger and Naudin: Bull. Soc. Chim., 12, 204.

separatory-funnel to extract a small amount of the triacetylglucose for analysis, and the residue was dissolved in 2 liters of water, and used in all the succeeding work. The benzene solution was evaporated to dryness and let stand in a desiccator over lime. The triacetylglucose remained behind as a thick oil with a faint smell of acetic acid. This oil was analyzed, and the analysis proved it to be triacetylglucose.

0.5186 gram substance gave 0.8945 gram CO_2 and 0.2743 gram H_2O .

	Calculated for $\text{C}_{12}\text{H}_{18}\text{O}_9$.	Found.
C	47.06	47.04
H	5.88	5.94

As this analysis would not show the composition of the main portion of the triacetylglucose, but only of that portion extracted with benzene, the 2 liters of triacetylglucose solution were analyzed as follows:

If the triacetylglucose (?) solution were treated with an alkali and boiled, the acetyl groups would be split off by hydrolysis and would neutralize part of the alkali; it should titrate as if it were N/3.30 acid. We titrated the boiling triacetylglucose solution against N/5 potassium hydroxide; when nearly neutralized the solution became slightly brown, so that the end of the titration could not be sharply detected. The results showed that the triacetylglucose solution was apparently N/3.44 acid; in other words, there seemed to be about 2.9 acetyl groups, instead of 3, to each glucose molecule. As this makes really no difference, as far as our problem is concerned, we shall use the expression "triacetylglucose solution," when speaking of the above solution.

	N/5 KOH solution. cc.	Triacetylglucose solution. cc.
1	13.00	8.86
2	17.24	11.71
3	20.64	14.39
4	28.04	19.42

Strength of triacetylglucose solution, N/3.44.

The main portion of the triacetylglucose, which was dissolved in the 2 liters of water, had a small amount of acetic acid in it. This

amount was determined by titration with N/5 potassium hydroxide, using phenolphthalein as the indicator, this being the indicator used in all titrations.

	N/5 KOH solution.	Triacetylglucose solution.
	cc.	cc.
1	0.67	5.56
2	0.90	7.08
3	1.00	8.47

Therefore, 1 cc. of the triacetylglucose solution equals 0.1218 cc. of the N/5 potassium hydroxide solution or in N/41 in acid strength. This triacetylglucose solution was kept in an ice-box during all the work, and titrations of the acid strength were made from time to time. These titrations showed but little variation among themselves; in other words, triacetylglucose is not hydrolyzed to any appreciable extent by water at 0° C.

But a rise in temperature produces a very important change. As is well known, previous experiments by different men have all shown that in esterification or saponification reactions the rise in temperature increases the velocity of the change, but the amount of change is independent of the temperature. A solution of triacetylglucose that remained about N/42.50 for thirteen days, when kept at 0° C., was then kept at 37° C. An increase in the amount of hydrolysis was immediately noticeable, and the acidity in two days was N/35.7. We seem to have in triacetylglucose an exception to the above law. Whether the triacetylglucose is not hydrolyzed by water at 0° C., and is at 37° C., or whether the hydrolysis is so very slow at 0° C., that the acidity is practically unchanged in thirteen days, we cannot say at present.

The action of the enzymes, pancreatin, amylopsin, emulsin, maltase, diastase, takadiastase, etc., was tried. One hundred cc. of the triacetylglucose were treated with 0.5 gram to 1 gram of the enzyme to be studied, and were kept at a constant temperature of 0° C. Titrations were made at the beginning, and also every day or two, to determine the increase in the amount of acid present, and unless stated otherwise, the titrations of a given solution were made at the same time on each day; that is, exactly twenty-four hours, or a multiple of this time, apart. In some cases the enzyme itself has a slightly acid reaction, and the proper corrections have been

made in the succeeding tables for this. In all cases studied, the enzyme hydrolyzed triacetylglucose into glucose and acetic acid. The amount of glucose present did not vary; that is, the enzyme did not use up any glucose. Some enzymes hydrolyzed only a small amount of the triacetylglucose, while others effected relatively a large amount of hydrolysis. Pancreatin seemed to be the most active. Not only does pancreatin hydrolyze triacetylglucose, but it is also capable of effecting the union of acetic acid with glucose to form the glucose ester. Only a few experiments were carried out in this line, but these were carefully made and, together with the work of the previous paper, seemed to prove that we are dealing here with a reversible action.

As most of the experiments were carried out at 0° C., we thought that it would be interesting to carry out some at 37° C. We find that the activity of pancreatin is greatly increased by a rise in temperature. As will be seen below, 0.5 gram of pancreatin in 100 cc. of triacetylglucose which, at 37° C., had become about constant at N/33 in acid strength, became N/26 in two days. The increase in acidity was N/123. One gram of pancreatin, or twice the above amount, in 100 cc. of triacetylglucose at 0° C. required two days to produce this increase in acidity; pancreatin then showed twice as much activity at 37° as it did at 0° .

Many experiments show that in the hydrolysis of cane sugar, ethyl acetate, etc., by a given acid, the amount of hydrolysis is proportional to the amount of acid used. Experiments in which we used varying amounts of pancreatin in 100 cc. of triacetylglucose solution, showed that the amount of hydrolysis is dependent upon, and very nearly proportional to, the amount of enzyme present. The hydrolysis of the triacetylglucose is in no case complete. This does not necessarily show that the reaction is reversible; as the acetic acid produced would inhibit, to a certain extent, the action of the enzyme, and would finally cause the reaction to come to a standstill.

Experiment to Determine Whether Glucose and Acetic Acid React at 0° or at 37° .—Twenty grams of recrystallized glucose melting at 147° and 5 cc. of glacial acetic acid were dissolved in 1 liter of water and titrated against N/5 potassium hydroxide solution, using phenolphthalein as indicator. The acid strength was N/11.70. After sterilizing at 120° for five minutes, the acid strength was N/11.51. The solution was kept sterile in a flask with a siphon, so that portions of the liquid could be withdrawn without infecting

the solution. Two days later the solution showed the same acid strength, N/11.51. Nine days later the acid strength had not changed, and the sterilized solution was then kept at a constant temperature of 37°. On the tenth day the acid strength was N/11.47, and on the fourteenth day was N/11.51. This shows that in a dilute solution of glucose and acetic acid there is no appreciable action and we need not consider this in our further work.

Experiment to Determine Whether Pancreatin Acts upon Glucose in a Sterilized Solution.—A solution of 5 grams of pure glucose (melting at 147°) in 100 cc. of water was sterilized and cooled to 0° C. To this was added 0.5 gram of pancreatin that had been washed several times with absolute alcohol. To this solution was added a small amount of a mixture of thymol and toluene to keep the solution sterile. The mixture was thoroughly shaken and allowed to remain in the ice-chest a short time. Ten cc. were withdrawn by means of a sterilized pipette and titrated against N/5 potassium hydroxide, using phenolphthalein as indicator. One drop of the potassium hydroxide solution, or 0.03 cc., was enough to produce a decided pink color. The solution was allowed to remain in the ice-box four days, but no change was visible. No gas was given off, showing that no fermentation had taken place. At the end of the fourth day 10 cc. of the solution were removed, as before, and titrated. One drop, or 0.03 cc., of the potassium hydroxide solution was again sufficient to produce a decided pink color. Enzymes do not ferment sugars, and in our further experiments upon the action of enzymes on triacetylglucose we are sure that there is no formation of acid from part of the glucose formed by the hydrolysis of the triacetylglucose.

Experiment to Determine Whether Pancreatin in Sterilized Water Decomposes and Forms an Acid or Alkaline Solution.—One-half gram of pancreatin was added to 100 cc. of distilled water and 1 cc. of toluene was added. The solution was kept at 0° C. It was slightly acid, as the following titrations show:

Titration at the Beginning.

N/5 potassium hydroxide solution.	Pancreatin solution.	Acidity.
cc.	cc.	
0.12	5.00	
0.17	7.00	N/207

Titration after Forty-eight Hours.

0.11	5.00	
0.24	10.00	N/215

The acid strength of the pancreatin solution is N/215, a hardly perceptible change from the above. In further experiments, then, we can disregard the decomposition of the enzyme itself.

Triacetylglucose Solution.—As stated above, this stock solution was kept sterile by means of toluene and thymol, and was kept in an ice-box. Titrations were made from time to time to see if any hydrolysis could be detected. As seen from the tables there was no appreciable change in the acid strength, and no fermentation was ever noticed.

Titration at the Beginning.

N/4 potassium hydroxide solution.	Triacetylglucose solution.	Acidity.
cc.	cc.	
0.60	5.09	
0.75	6.37	
0.95	7.95	N/42.45

Titration after Twenty-four Hours.

0.59	5.03	
0.89	7.34	
1.04	8.60	N/41.85

Titration after Forty-eight Hours.

0.60	5.09	
0.88	7.14	
1.11	8.83	N/40.65

Titration after One Hundred and Twenty Hours.

0.58	5.00	
0.86	7.00	N/42

Titration after One Hundred and Forty-four Hours.

N/5 potassium hydroxide solution.	Triacetylglucose solution.	Acidity.
cc.	cc.	
0.57	5.00	
0.85	7.00	N/42.50

Other titrations were made after this time but no appreciable change was noticed.

Experiment to Determine the Change in a Solution of Triacetylglucose by Raising the Temperature from 0° to 37°.—As we expected to carry out experiments in which the solution of triacetylglucose would be subjected to a change in temperature from 0° to 37°, it was thought necessary to determine whether this solution itself would change in acid strength upon heating. A sterilized solution of triacetylglucose was titrated and then put into an oven having a constant temperature of 37°. As will be seen from the tables, the amount of hydrolysis was increased by a rise in temperature.

Titration at the Beginning.

N/5 potassium hydroxide solution.	Triacetylglucose solution.	Acidity.
cc.	cc.	
0.60	5.00	
0.86	7.00	N/41

Titration after Twenty-four Hours.

0.66	5.00	
0.95	7.00	N/37.5

Titration after Forty-eight Hours.

0.70	5.00	
1.41	10.00	N/35.7

In two days the acidity of the triacetylglucose solution increased from N/41 to N/35.7. As will be seen below, this solution finally became constant at about N/33.

Hydrolysis of Triacetylglucose by Pancreatin.—A solution of 1 gram of pancreatin in 100 cc. of the above solution of triacetylglucose was made, and the acid strength was determined by titration to be N/40.65. This, as were all of the other solutions, was kept sterile by means of toluene and thymol and was kept at constant temperature of 0°.

Titration after Forty-eight Hours.

N/5 potassium hydroxide solution.	Pancreatin solution.	Acidity.
cc.	cc.	
1.15	7.19	
1.42	8.71	
1.85	11.10	N/30.64

Titration after Ninety-six Hours.

1.00	5.00	
1.49	7.00	N/24.25

Titration after Two Hundred and Forty Hours.

1.18	5.00	
1.62	7.00	N/21

Hydrolysis of Triacetylglucose by Amylopsin.—One gram of amylopsin was dissolved in 100 cc. of triacetylglucose solution and kept sterile by means of toluene. The acidity at first was N/41.

Titration after Twenty-four Hours.

N/5 potassium hydroxide solution.	Amylopsin solution.	Acidity.
cc.	cc.	
0.70	4.95	
1.02	7.15	
1.28	8.95	N/35.10

Titration after Ninety-six Hours.

0.80	5.00	
1.20	7.00	N/30.20

Titration after Two Hundred and Forty Hours.

1.00	5.00	
1.40	7.00	N/25

Hydrolysis of Triacetylglucose by Emulsion.—This solution was made by adding 1 gram of emulsion to 100 cc. of the solution of triacetylglucose, and was kept sterile by means of thymol and toluene. It titrated N/40 acid at first.

Titration after Twenty-four Hours.

N/5 potassium hydroxide solution.	Emulsin solution.	Acidity.
cc.	cc.	
0.75	6.01	
1.05	8.25	
1.20	9.72	N/39.93

Titration after Ninety-six Hours.

0.60	5.00	
0.88	7.00	N/40.40

Titration after Two Hundred and Sixty-four Hours.

0.62	5.00	
0.87	7.00	N/40.50

We see that emulsin hardly hydrolyzes triacetylglucose even in ten days.

Hydrolysis of Triacetylglucose by Maltase.—Fresh malt was powdered and sifted and 4 grams added to 100 cc. of the solution of triacetylglucose. This was kept sterile in an ice-box. The solution was N/42.44 at first.

Titration after Forty-eight Hours.

N/5 potassium hydroxide solution.	Maltase solution.	Acidity.
cc.	cc.	
0.69	4.62	
0.97	6.64	
1.20	8.24	N/34

Titration after Seventy-two Hours.

0.79	5.24	
1.10	7.33	
1.49	10.02	N/33.35

Titration after Ninety-six Hours.

0.93	5.37	
1.11	6.52	
1.35	8.00	N/29.30

Titration after One Hundred and Sixty-eight Hours.

0.95	5.00	
1.39	7.00	N/25.75

Titration after Three Hundred and Thirty-six Hours.

1.13	5.00	
1.57	7.00	N/22.20

Hydrolysis of Triacetylglucose by Diastase.—This solution was made by adding 2 grams of diastase to 100 cc. of the solution of triacetylglucose, and was kept sterile by means of thymol. The temperature was kept at 0° C. The acidity at first was N/40.90, as shown by the tables.

Titration of Fresh Solution.

N/5 potassium hydroxide solution.	Diastase solution.	Acidity.
cc.	cc.	
0.63	5.10	
0.91	7.55	
1.19	9.70	N/40.90

Titration after Twenty-Four Hours.

0.96	7.60	
1.55	12.15	
2.05	16.15	N/39.39

Titration after Forty-eight Hours.

0.70	5.38	
0.90	6.93	
1.11	8.45	N/38.62

Titration after One Hundred and Twenty Hours.

0.66	5.00	
0.98	7.00	N/37.8

Titration after Two Hundred and Eighty-eight Hours.

0.71	5.00	
1.01	7.00	N/35

Hydrolysis of Triacetylglucose by Takadiastase.—This solution was made by adding 0.5 gram of takadiastase to 100 cc. of the solution of triacetylglucose. It was kept in an ice-box. The acid strength was N/41.

Titration after Twenty-four Hours.

N/5 potassium hydroxide solution.	Takadiastase solution.	Acidity.
cc.	cc.	
0.76	5.00	
1.10	7.00	N/32.35

Titration after Ninety-six Hours.

0.87	5.00	
1.19	7.00	N/29

Titration after One Hundred and Sixty-eight Hours.

N/5 potassium hydroxide solution.	Takadiastase solution.	Acidity.
cc.	cc.	
0.93	5.00	
1.32	7.00	N/27

Effect of Rise in Temperature on the Amount of Hydrolysis by Pancreatin.—One-half gram of pancreatin was added to 100 cc. of a solution of triacetylglucose that had been kept at 37° for some time, and that had become constant at about N/33. This solution was kept sterile by means of toluene and was kept at a constant temperature of 37°.

Titration at First.

N/5 potassium hydroxide solution.	Pancreatin solution.	Acidity.
cc.	cc.	
0.74	5.00	
1.08	7.00	N/33
<i>Titration after Twenty-four Hours.</i>		
0.89	5.00	
1.22	7.00	N/28
<i>Titration after Forty-eight Hours.</i>		
0.98	5.00	
1.89	10.00	N/26

As the table shows, the increase in acidity in forty-eight hours was N/123, which is approximately the increase produced by 1 gram of pancreatin, or twice the amount here used, in the same volume of the cold solution in the same time. The activity of pancreatin, then, is approximately twice as great at 37° as it is at 0°.

Experiments to Determine the Relation Between the Amount of Pancreatin Used and the Amount of Hydrolysis.—Three solutions were made containing 0.25 gram, 0.5 gram, and 0.75 gram, respectively, of pancreatin in 100 cc. of the solution of triacetylglucose. These were kept at 0° and were sterilized by means of toluene. As the tables show, the amount of hydrolysis is approximately proportional to the amount of enzyme used. The tables show the amount of acetic acid formed in one liter. The solutions were all approximately N/41 at first.

Titration after Forty-eight Hours.

With solution containing 0.25 gram pancreatin.

N/5 potassium hydroxide solution.	Pancreatin solution.	Acidity.	Acetic acid formed in 1 liter. Gram.
cc.	cc.		
0.69	5.00		
0.96	7.00	N/36	0.20
With solution containing 0.5 gram pancreatin.			
0.77	5.00		
1.11	7.00	N/32	0.41
With solution containing 0.75 gram pancreatin.			
0.83	5.00		
1.18	7.00	N/29.5	0.57

As can be seen, the figures 0.20, 0.41, and 0.57 gram are very nearly in the ratios 1 : 2 : 3.

Titration after Ninety-six Hours.

With solution containing 0.25 gram pancreatin.

N/5 potassium hydroxide solution.	Pancreatin solution.	Acidity.	Acetic acid formed in 1 liter. Gram.
cc.	cc.		
0.68	5.00		
0.97	7.00	N/36.5	0.18

With solution containing 0.5 gram pancreatin.

0.79	5.00		
1.10	7.00	N/32	0.42

With solution containing 0.75 gram pancreatin.

0.87	5.00		
1.19	7.00	N/29	0.60

Here again, the ratios of the amounts of acid generated are approximately the same as the ratios of the amounts of pancreatin used.

Titration after One Hundred and Forty-four Hours.

With solution containing 0.25 gram pancreatin.

N/5 potassium hydroxide solution.	Pancreatin solution.	Acidity.	Acetic acid formed in 1 liter. Gram.
cc.	cc.		
0.72	5.00		
0.99	7.00	N/35	0.25

With solution containing 0.5 gram pancreatin.

0.83	5.00		
1.18	7.00	N/30	0.54

With solution containing 0.75 gram pancreatin.

0.91	5.00		
1.25	7.00	N/27.5	0.72

As will be seen from the above tables, the amount of triacetyl-glucose hydrolyzed is very nearly proportional to the amount of pancreatin present.

Experiment to Determine Whether Pancreatin Can Cause Esterification in a Mixture of Glucose and Acetic Acid.—Twenty grams of glucose (melting-point 147°) and 5 cc. of glacial acetic acid were dissolved in 1 liter of water. Fifty cc. of this solution

were diluted to 200 cc., and to this solution were added 0.5 gram of pancreatin and 2 cc. of toluene. The solution was kept at 0°.

Titration at First.

N/5 potassium hydroxide solution.	Pancreatin solution.	Acidity.
cc.	cc.	
0.67	5.00	N/37.35

Titration after Twenty-four Hours.

0.66	5.00	
0.93	7.00	N/37.75

Titration after Seventy-two Hours.

0.63	5.00	
0.89	7.00	
1.52	12.00	N/39.50

Titration after Ninety-six Hours.

0.62	5.00	
0.88	7.00	
1.51	12.00	N/40

Titration after One Hundred and Twenty Hours.

N/5 potassium hydroxide solution.	Pancreatin solution.	Acidity.
cc.	cc.	
0.63	5.00	
1.25	10.00	N/40

As the tables show, the acidity decreased from N/37.35 to N/40. When the acidity had decreased to N/40 we noticed that the pink color of the solution that had been titrated would nearly disappear after a short time, indicating the presence of glucose acetates, which were slowly saponified by the potassium hydroxide. As the decrease in acidity in this experiment is only a very small amount, we do not think this decisive. We are therefore carrying out other experiments to determine this point more carefully. But when these results are taken in connection with the previous paper, in which it was clearly shown that such esters were formed by bacteria, it is very probable that further experiments will show decisively that enzymes can form glucose acetates from, as well as hydrolyze them into, glucose and acetic acid. The work has been unavoidably interfered with, but we shall now take it up again, and the above is intended as a preliminary announcement.

CERTAIN PHASES OF PULP CANAL TREATMENT.*

BY C. N. JOHNSON, M. A., L. D. S., D. D. S., CHICAGO, ILL.

The importance of this subject at this particular time cannot be overestimated. The relation of oral sepsis to diseases of the general system is being emphasized as it never was before, and the possible causal relationship of pulpless teeth as a prominent factor in oral sepsis makes it imperative that we study more carefully than ever the best means of managing these cases.

The history of the development of the present-day interest in this subject is somewhat peculiar. For many years the leading writers in the dental profession tried to impress upon their readers the fact that mouth conditions had a direct bearing on the bodily health of the individual. They also endeavored to call the attention of the medical profession to this fact. But neither dentists nor medical men as a whole seemed to take the matter at all seriously. Finally Hunter of England, a medical man, called attention to it in such a way that it could no longer be ignored; in fact, he roused some feeling on the part of dentists by intimating that much of the oral sepsis which was causing bodily ills was due to bad dental operations such as crowns and bridges. He called them "gold traps of sepsis" and other harsh names, and the fact that a lay periodical reprinted the article (which had originally appeared in the *London Lancet*), and in some sense distorted Hunter's meaning, it led to misunderstanding and some censure of the author for his apparently sweeping condemnation of dental operations.

But it served a very useful purpose in awakening the profession to the fact that there rested upon it a responsibility which heretofore had been ignored by too many men in practice, and there were not a few who contended that, after all, Hunter's strictures were not far wide of the mark. More recently some of our leading medical practitioners are tracing various ills, such as rheumatism, endocarditis, arthritis, and kindred affections to chronic alveolar abscesses or other foci of infection about the

*Read before the Alumni Association of the Dental Department, University of Buffalo, February 5, 1915.

teeth. In this way the significance of oral sepsis is being emphasized to a degree never before approached, and the profession of dentistry is placed on its mettle to control oral sepsis in the mouths of patients applying to it for service. The slogan which at one time went forth that no tooth should be extracted which could not be taken out with the fingers has changed to one which says that every tooth must be extracted unless it can be made perfectly healthy. And the result of all this is that the mouths of our patients will be made more wholesome and less dangerous to their welfare.

It is true that with this movement, as with every other, serious mistakes are being made. Teeth are condemned to the forceps which are guiltless of any wrong, and the loss of which is a damage which can never be repaired. It is growing too much the habit with certain medical men if a patient has rheumatism or is ill in any way, to blame the trouble on the teeth. Straightway an X-ray is made of the teeth and jaws, and all sorts of dire disaster is read into these X-rays. Too frequently the physician orders the extraction of the teeth without referring the patient to a dentist for a careful examination, and a serious and irreparable wrong is done. In this connection it may be stated without any disparagement of medical men that they are usually unable to perfectly interpret an X-ray of the teeth and jaws, and as a consequence they are condemning teeth today on the strength of what they see in the X-ray that are in no way accountable for the trouble their patients are having. The correct interpretation of X-ray pictures of the teeth and jaws is sufficiently difficult even by those who are constantly studying them, and an offhand diagnosis by a man not especially trained in this work is frequently an injustice to the patient. Let it be understood that I am not discountenancing the X-ray, or its great value as a diagnostic aid. I am simply deprecating the snap judgments that are passed on it without sufficient care or knowledge to properly interpret it. And there are some manifestations of the X-ray which will puzzle the most expert; for instance, it is difficult to tell by the X-ray whether a certain light area around the end of the root of a tooth is due to the presence of an alveolar abscess or whether it is merely the space where an abscess once was, but which has long since been filled

in by a new growth of tissue. When it is admitted that there is this possibility of error men should be extremely careful about ordering the extraction of a tooth on such evidence.

On the other hand, the dentist must aid the physician in clearing up every possible focus of infection in the mouth, and to this end he should look carefully to every pulpless tooth and see that it is made healthy. If this cannot be done it should be extracted. But in the face of the present hue and cry against pulpless teeth it may be stated most emphatically that many of them, in fact, most of them, may be made healthy and serve a useful purpose for the patient. This involves more care and a better technique than many men have given this work in the past. There is to my mind no operation in dentistry more difficult or exhausting than to properly clean and fill some pulp canals. A man may so perfect his gold foil operations or his inlay work that he can do good service at the chair with these operations in an almost automatic manner. In other words, he may insert a foil filling while he is thinking of a favorite opera, or play, or song, or poem—in fact, sometimes he will do more beautiful work by reason of thinking of these things—but he cannot successfully clean out or open up a tortuous canal without concentrating his every energy upon the operation itself. It never becomes automatic. Each case calls for a different kind of achievement, and frequently a different form of hardship.

And I am going to be frank enough at the beginning to say that under the conditions in which we are compelled to work in the mouth and the difficulty of access to certain canals, I am not one of those who claim that they can clean and fill every root to the apex. As has frequently been stated, many canals are so curved and constricted that it is almost a mechanical impossibility to clean and fill them to the end. I admire patience and perseverance in work of this kind and I commend the man who makes an honest effort to reach the apex of every canal, but I believe the attempt to do this in every case will often end in disaster. For instance, there are some of these fine curved canals with roots that almost form a hook in their extreme curvature where the finest broach bent at any angle will not enter to the apex. To attempt to ream out such canals with a drill of any kind must inevitably end, as all such efforts have ended,

in drilling through the side of the root. To even attempt to get through the canal with Schreier's preparation of sodium and potassium is futile. In fact, it is a physical impossibility to completely open up these canals with the tooth in the mouth.

What shall we do in such cases? Shall we invariably extract a tooth if we cannot pass a broach to the end of the root and fill it? This is the stand that is being taken today by some men in the profession, and men who have not been considered ultra-radical. In fact, Dr. M. L. Rhein of New York goes one step further and claims that a pulpless tooth is not altogether safe unless the root filling passes a trifle beyond the canal so as to encapsulate the end of the root. This he does with a solution of chloro-percha, working it into the canal till it flows past the apical foramen and floods the apical space. He uses some very convincing logic in his argument for this practice, and shows some skiagrams in which the method is beautifully illustrated. He is strong in his conviction that this is the only safe method of filling pulp canals, and yet I must acknowledge that in my hands I would not consider it safe at all. In the first place, as I have said, I am not confident of my ability to reach the ends of all roots with certainty, and even if I were I should be fearful of the practice of always forcing any material beyond the apex. My reason for this is that in my experience in the management of pulpless teeth any attempt to go beyond the apex has usually resulted in disturbances which left the tooth somewhat sore, or as the patient expresses it, "lame." And this has happened when the utmost aseptic precautions have been taken. Nor does the soreness always prove temporary in character. It sometimes persists so long as to be embarrassing to the operator, and to leave him with the feeling that he has caused his patient unnecessary and prolonged discomfort by too much operative interference. And yet in the same breath I must make the statement that I would much rather see the profession adopt the theory of getting to the end of every root and making the effort to do so, than to follow the slipshod methods practiced by many operators in which there has apparently been no effort at all to remove the contents even of large canals, to say nothing of reaching the apex. The profession has much to answer for in its lack of thor-

oughness in this operation, and the crusade against careless pulp canal treatment has come none too soon.

What, then, shall be our course with those canals which are too tortuous or fine to permit of instrumentation to the end? This is a very serious question and one that must be met squarely and without equivocation. In the first place there are two factors connected with this question which require emphasis at this time—one that the advent of the X-ray has made it possible for us to form a more intelligent idea as to the probable length and direction of canals, and the other that usually in curved roots which are difficult to follow the canals are exceedingly small, leaving very little pulp tissue to be dealt with. By the aid of the X-ray we are able to trace many canals which without it would be a sealed volume to us, and whenever we are in doubt about the shape of a root we should call the X-ray to our assistance. In every instance we should aim to open up canals and clean out their contents as thoroughly as possible, and it may be well as this point to devote a few moments to the technique of doing this. To begin with, the pulp chamber should be well uncovered, so as to leave the openings to the canals exposed. In some instances it will be found difficult to detect the minute orifices to certain canals, particularly buccal canals in upper molars and mesial canals in lower molars. The best means of doing this is to flood the pulp chamber with alcohol and then evaporate it with warm air. In every instance when the opening to the canal is exposed it can be instantly detected by the difference in appearance as soon as the chamber is dry. An opening so small that no distinction can be made between it and the floor of the chamber when moist will at once take on a characteristic appearance the moment it is dry. As soon as the entrance is discovered it should be gently probed with a fine broach to determine, if possible, its direction. Then a reamer in the engine should be used. I have just said that to attempt to ream out a curved canal was likely to result in drilling through the side of the root, and this still holds true. But the reamer has another use, not to go up into the canal, but to ream out the orifice of the canal as it enters the pulp chamber, and thus to permit of a better approach of the broach. In many of these cases the junction of the canal with the chamber seems constricted and in

any event to ream this out to a funnel shape admits of a more ready entrance to the canal without any danger of going through the side of the root if the reaming is stopped at this point. In some instances where the direction of the canal is plainly evident and an accurate application of the engine canal drill can be made there is no objection to reaming out the canal for a short distance, but this should be done only to the point where the direction of the canal can be seen. For this purpose the best form of reamer with which the essayist is familiar is the Beutelrock drill. This drill is so made that if it breaks at all it will do so up near the shank, which leaves ample opportunity for its removal. But most of the cleaning of these canals should be done with a broach. The Kerr twist broach will sometimes prove very serviceable for this purpose, but for the most part a broach made from piano wire filed to leave angles on the sides will be the safest and most effective. And it is in this particular operation that the greatest patience and concentration are required. As I have said, there is no more difficult operation in dentistry and no operation more important than this. Every man who essays to save pulpless teeth should be willing to put the most painstaking care into this work, and should not stop short of removing every particle possible from every canal.

And this brings us back again to the query: What shall we do with those canals which cannot be manipulated to the end? These cases have given me much thought for several years, and I have been testing out a method of treatment which I have not felt like suggesting to the profession for obvious reasons till it was thoroughly tried out. Even now I hesitate to advocate it lest there spring up various abuses with it which I shall mention later. We all know the efficacy of formo-cresol, given to the profession by Dr. J. P. Buckley, as a treatment for putrescent pulp canals. I know of no remedy which is so effective for this purpose. We also know of its irritating properties, and the care that must be exercised in its use. If it can be confined in the chamber or canal of a tooth it will more surely render the parts aseptic than any other preparation with which I am familiar, and it occurred to me that if I could seal this agent in one of these teeth with the fine and tortuous canals in such a way that it could not escape, and allow it to remain for an extended time—

say a month or two—it would leave the tooth in the most aseptic condition possible. This I did by making a paste of the formo-cresol with oxid of zinc or the powder which comes with the oxyphosphate of zinc cement, and incorporating this thoroughly into a small rope of absorbent cotton sufficient to fill the canal and chamber. If there is more than one canal a small strip of cotton should be used for each one. Then the cotton containing the formo-cresol paste is gently forced into the canal and the cavity filled with oxyphosphate of zinc. This is allowed to remain sometimes as long as two months, when it is removed and the tooth filled permanently. It will be found that the canals under this treatment are clean and dry and in the best condition to receive a filling. My method of filling these cases is to flood the chamber with the euca-percha solution, and touch it with a hot instrument which renders it almost liquid. A fine broach is then used to pump the solution into the fine canal as perfectly as possible, and over this is placed some pink base plate gutta percha and with a hot instrument pressure is brought to bear gently on the gutta percha to seal the canal as tightly as possible. Over this is then placed some oxychlorid of zinc to fill the entire pulp chamber, and the operation is completed with a permanent filling. Of course, if there are any canals leading from the same pulp chamber large enough to receive gutta percha cones they are used in the ordinary way.

Since I have employed this method my patients have been more comfortable with this class of cases, and there has been less complaint of subsequent “lameness” in these teeth. Used in this way there is no danger of the formo-cresol escaping beyond the apex and causing trouble from irritation.

I have also experimented with this treatment in two other classes of cases with the most satisfactory results. Sometimes in the management of putrescent teeth the patient complains of a slight tenderness on pressure, even where there has been no evidence of alveolar abscess. This “lameness” may have been apparent for an extended period, and it persists after weeks of treatment by the ordinary methods. When I encounter a case of this kind now I seal in the formo-cresol paste, and leave it for two and sometimes three months with the usual result that by that time the soreness has all disappeared and the canals are

in a perfect condition for filling. Then there are other cases of recent pulp destruction where a small portion of sensitive pulp tissue remains in the apical third of the root. It has always been difficult for me to remove this last vestige of fine, hair-like pulp tissue from these locations, and I hesitate to seal in liquid formo-cresol through fear of undue irritation. By sealing in the paste and allowing it to remain for two or three months the case will usually return with no sensitiveness and the canals dry and ready to clean thoroughly and fill.

In fact, this procedure has proved so satisfactory to me after a somewhat extended use that I would long ago have suggested it to the profession if it had not been for several rather serious limitations. I have feared that it might lead to some very careless and slovenly methods of treating pulpless teeth, and that too many men would fall into the easy habit of filling canals with cotton and the paste and letting it go at that. The teeth certainly become so comfortable in most cases as to tempt men to do that, and yet no argument is needed to prove that this is not a suitable permanent root filling. In fact, it should be looked upon purely as an extended treatment of the case without the operator disturbing conditions by constantly opening the cavity and overmanipulating it. In the past many cases of chronic abscess have been kept going by too frequent disturbance in the way of treatment, and it is sometimes a good idea to let the parts rest and give nature a chance to repair the damage. In no case should this paste be sealed in a tooth without specifying a time to the patient when it should be removed and the tooth filled. Not only this, but the patient must not be trusted to remember the time. A record should be made of the date of the treatment and the time when the patient must be seen to have it removed, and when this date arrives the patient should be notified. And just here is a serious drawback to the method. It frequently happens that occurrences arise by which the patient cannot or does not return, and I have had some of these cases go a year without removal, while others have never returned. Quite probably they have gone to some of my colleagues, and I have thereby gained the unenviable reputation of filling pulp canals with cotton. I never use this paste without informing the patient that it is a temporary procedure and must be attended to later, and yet

human nature is so peculiar and forgetful that many patients fail utterly to remember any injunction that is laid on them.

In fact, this feature of the case has sometimes been so disheartening that I have been tempted to discontinue the practice, but when I see so many teeth of a character which formerly gave me much concern and of which I never felt quite sure, clearing up under this method and remaining comfortable, serviceable and healthy, I feel that I cannot give it up. The method is brought to you on this occasion with the reservation that it must be employed for a specific purpose, with definite limitations, and not as a panacea for all the ills encountered in pulpless teeth. But I feel confident that if used under the proper indications and in the proper manner it will prove a very important aid in controlling some of the most trying conditions met with in this class of work, and to this end I commend it to your careful consideration.

In conclusion, I should like to be permitted to remark that no paper on the subject of pulpless teeth is ever quite complete which does not contain a word of caution regarding the too prevalent practice of destroying pulps without sufficient cause. The impression given forth by some writers that the function of the pulp ceases the moment the tooth is formed, together with the pat but unfortunate phrase that "dead pulps tell no tales," have been accountable for the destruction of too many pulps. Pulps frequently die before the dentist sees the case, and other pulps which come to the dentist alive must be destroyed for various reasons, but no pulp should be deliberately destroyed as a matter of expediency or convenience to the dentist if it can be preserved alive in a healthy condition. The moment the pulp chamber or canals of a tooth are entered a problem is presented for the conscientious dentist to solve—a problem which in the light of what we are now learning of the ills arising from pulpless teeth becomes more and more a serious one. Let us preserve pulps whenever it is possible to do so and maintain their health, but when they must be lost let us do our utmost to conserve the best interests of the patient by the most painstaking care in the technique of treating and filling the canals.

PROCEEDINGS OF SOCIETIES.

CHICAGO DENTAL SOCIETY.

The fifty-first annual meeting of the Society was held at Hotel La Salle, January 29th, 1915, with the President, Dr. T. L. Grisamore, in the Chair.

Dr. Robert B. Preble read a paper entitled "The Etiological Relationship of Focal Infection to Remote Diseases."

Dr. Elmer S. Best, Minneapolis, read a paper on "Pulp Devitalization."

These two papers were discussed together.

DR. FRANK BILLINGS:

Mr. President, Ladies and Gentlemen. I agree heartily with much that Dr. Preble has said. Perhaps we will differ in opinion somewhat concerning the relationship of chronic foci to chronic processes. What Dr. Preble has said about the acute foci and acute systemic diseases related thereto any good clinician will agree with.

There are certain principles connected with focal infection related to systemic disease that I think should be stated, and especially those concerning chronic processes, both focal and systemic. A primary chronic focal point may be located almost anywhere in the body, and we may safely say there is a secondary type of focus, and it may be more than one, certainly two. Let us take the chronic primary focus, for example, mentioned by Dr. Preble when he spoke of a great number of people, especially the poor, in our general hospitals who universally suffer from chronic alveolar disease due doubtless to a want of personal cleanliness to start with and non-attention to the correction of it. Right here we ask ourselves the question, as Dr. Preble brought out, why is it those people who so commonly suffer from foci of infection in the jaws do not present systemic disease?

He called attention to the fact that there is an incidence of one per cent. of chronic arthritis to fifty per cent. of people who present conditions in the mouth. He spoke of it as supposition, but I call it a principle now where the focus of infection in the mouth is related to the chronic arthritic disease. He also called attention to the fact that we are the common harbingers in our noses and

throats of the pneumococcus. That has been proved by my own observations.

A few years ago I was a member of a committee upon respiratory diseases, appointed by the Mayor of New York, to examine into the question of the prevalence of respiratory diseases, and I was requested to investigate the presence of pathogenic organisms, particularly the pneumococcus in the noses and throats of people. We found on investigation that of ten nurses examined in the County Hospital all had pneumococci in their throats; that of ten house doctors examined, all had pneumococci in their throats; that of ten patients in the wards, all had pneumococci in their throats, and that if ten people, stopped on the streets and voluntarily permitted a cultural swab to be made, they would show pneumococci; that ten people examined in the offices of the Illinois Central Railroad Company showed pneumococci. In Wisconsin in villages, on the average six out of ten persons showed pneumococci in their throats, and going out into the country among farmers some of them with ten in a group showed no pneumococci. Investigation showed the prevalence of infection of other types in the noses and throats of people who live in crowded communities. Of the people examined who had pneumococci in their throats none suffered from any of the ordinary clinical signs of pneumonia. Why not? I cannot answer that question except in a general way. It can be answered by answering one or two other questions. Either the pneumococcus that was present in those throats lay there in a non-virulent form to start with, or the defences of those people were so strong against this little focal infection that they suffered no systemic disease.

If that is true of pneumonia, why is it not true of a chronic focus in which the organisms will lie and in which one individual out of fifty may succumb to arthritic chronic disease, while the other forty-nine have their defences up against it?

In this primary focus, we may say that there are numerous organisms present. Let us take the subject for consideration to-night, alveolar infection, it usually is due to a streptococcus; sometimes it is due to a staphylococcus, and many times one finds in different organisms; sometimes we find the Welch bacillus or a fusiform bacillus and others, but the ones which seem related to systemic disease belong to the streptococcus group. In making

cultures from such a focus we find different types of streptococcus. Usually the dominating types are the so-called streptococcus viridans and a streptococcus which hemolyses the blood, the so-called hemolytic streptococcus, but there are others. To simply say because we find the streptococcus viridans it is related to this joint or that muscle or that heart is not right, because as we know, if we know anything, the streptococcus viridans is usually a non-virulent organism. It grows on the surface as a rule; it grows best in a high oxygen content; it does not grow in a small oxygen content, as a rule. It grows abundantly when once it gains admission to the blood stream. It is found in subacute endocarditis, which is practically always fatal, because the streptococcus viridans living in much oxygen content continues to find new soil from which it vitalizes and keeps up. But when you put the streptococcus viridans in a culture tube and leave it there for a while, in many instances when you replace and examine it again it is no longer the streptococcus viridans; it is a hemolytic one or some other type, and that happens time and again. You may find the hemolytic type in the first plate and subculture, but if you put it away for a month it becomes converted into another type. If mutation takes place outside, who should it not occur in a focus of infection? We have no means of verifying that, except by its cultural characteristics.

The types of organism which infect people's joints and muscles in a chronic way, are not those which hemolyze blood or those that grow in a large oxygen content, but the streptococcus viridans. When you recover these streptococci from a patient, not from animals; when you take them from the muscle of a patient who is suffering; when you cut down upon the capsule of a joint and take pus out of it, and take a fibrous node from a tendon, or find a necrosis; when you take a lymph node from near a joint, and from a joint, you get a different type of organism. Yet get a type of organism, which, when injected into an animal, produces the same condition that you find in a human being. Furthermore, you will find in all these cases where tissue is removed from man and examined histologically, the same conditions of tissue that you find in inoculated animals, showing the same organisms passing from the infected tissues through the blood stream. Hematogenously they do not pass through the

lymphatics. Secondly, they may do so. They pass through the blood stream and produce emboli lodging in the vessel. They cause proliferation of the cells of the blood vessel and obstruct it. This is not theory. This is microscopic observation of tissues of human beings suffering in this way, fortified further by examination of animal tissues inoculated and producing the same lesions in the animal. Therefore, we know when we speak of this type of infection secondary to some focus, if it came from some focus it went through hematogenously, we may say, and left the organism in the tissues. These organisms grow, if there is much oxygen content, in the muscle, the capsule of joints, and elsewhere and produce a condition which permits them to stay, because they produce obstruction to circulation, less blood and less oxygen. Therefore, they exist there for a long time.

From our studies of the anatomic changes which occur in a muscle which becomes sclerosed, or in the joint tissues themselves, we can say they are due to the cutting off of the circulation by the embolic processes quite as much as by any toxic or infectious condition due to the organism or the toxin of the organism.

There are secondary focal infections. If any of you have had the opportunity of watching one of these patients suffering from one of these chronic diseases, as chronic arthritis, for instance, you will find many of them with general debility, often with lowered vitality and anemia, and more or less emaciated while under observation if they have an infectious local process. Let us take an alveolar abscess or a sinus somewhere in the body, we have seen it over and over again. Whether there was a beginning focal infection there and the defences were let down, and how it occurred we do not know, but we do know it occurred, and once occurring it seems to bear the same relation to the continued systemic process that the primary focus does. Often a second focus of infection occurs from the first in these systemic conditions, occurring hematogenously and lodging as emboli, and as there are living organisms in the tissues in certain regions of the body they attack a new focus and spread the disease to different points so that we have these two things to consider when we take up the question of the focus of infection related to

systemic disease and the results in the treatment of the patient by the removal of the primary focus.

Dr. Preble made the statement that he had failed to find the improvement which he would expect from removal of the focus in these arthritides, especially. That is not strange. It is strange in one sense to me that Dr. Preble said, that mostly because, knowing him as I have so many years, I should think he would try to find out why he did not have a result, but apparently he has not. I find many practitioners do not have results. No rational human being would expect a patient who has suffered from chronic arthritic disease, until there is actual destruction of tissue, to be restored to health with the restoration of all of the tissues of his body. You cannot hope for that. In many of these patients, suffering for a long time, much of the deformity is due to an increase in connective tissue, and contraction in consequence, and to atrophy from nonuse, both of bone and muscle. It is simply a question of restoring nutrition to these parts. In the treatment of these cases, if you let the result of treatment, including the question of removal of the focus, determine the factor as to whether it is the cause of the systemic disease and let that be answered by simply stopping when you remove the focus of infection, you will have a negative answer in most instances, but if you understand its pathology you will proceed with a line of management to undo it and you will achieve success. I am not saying this in any theoretical spirit, nor when I say it am I speaking in a spirit of assumed authority or unusual knowledge and privilege because of it, but I am only speaking because after years and years of work over these patients I have seen results from certain management of them, which finally relieved them, although it sometimes takes years to do it. Bearing in mind what I have said, there is a chronic focus of infection in a chronic arthritic patient of the deforming type, that has not gone on to destructive lesions of bone and cartilage, and so on. You will find that in alveoli as an example. Without finding anything anywhere else you will try to clean up that patient's mouth. He is already infected. You cannot remove his teeth and turn him loose and say the man is cured, because you have removed the source of the disease. You must try to remove those organisms which infect him systemically, and inasmuch as the infec-

tion occurs hematogenously and obstructs blood vessels, by some means you must restore the circulation locally before you can expect to have restoration of function of the diseased joints. One may say, why not try to remove all these secondary conditions and let the primary focus go, because possibly the primary focus is due to the general debility of the patient? Well, we know we can improve these patients without touching the teeth, but it is a harder fight. So it is essential to clean up the patient as well as we can to start with and fight the organisms, and we do that by building up his own defences, and one of the first things is to put him in an environment where he will be at peace with the world. If you do not do that he will neither eat nor sleep, so that every individual is a problem unto himself in that regard.

Next you have got to feed him. Give him a nutritious diet that will help to build up the whole body. Look after his excretions. If constipation is of long standing it has got to be cared for. If he has some kidney condition that needs attention, clear out the toxins from the body. They must be attended to. He must have rest. After these things are done you will find these patients begin to feel better. There is less pain, less discomfort. When that is done, you can begin the next thing which is the restoration of circulation, both local and general, by hydrotherapy, by massage, passive and active movements, and these things have to be carried on for months and months, and each individual studied according to his needs and requirements. When that is accomplished, and that is the hardest problem of all—you will be surprised to see that conditions you would have believed a few years ago could not possibly be removed, are finally banished.

I have been at this work for ten years, consequently the vast material I have seen enables me to speak with some authority. I do not believe in relating cases, but last Friday I was gratified to see the final outcome of one of the worst cases we have ever had. Three years ago a poor man came from Iowa with an arthritis which began in his spine. He had almost what is called the "poker" spine. He walked with great stiffness. This was due to the muscles of the back, and not to the spine itself. He had diseased tonsils. He had bad teeth. He had had gonorrhea, and he had an infected prostate. We could not say which one of these conditions was at the bottom of the trouble. Everything was

cleaned up. After his tonsils were taken out he had infection of every joint in his body so that he then suffered from polyarthritis of the chronic type—low, deforming. He became discouraged, and I embarrassed. It took eight months before that man could get on his feet. While in the hospital for several months under rest, nutritious food, and the use of simple drugs and all that was necessary to build him up, he improved. He left the hospital still stiff, still sore, went home to rest a while, and then came back and stayed four months more, this time going out without crutches and with fairly mobile joints, coming back again after six months and staying one month, and then going home practically cured. The other day he came into my office with every joint as well as he ever had them, with his knees straight, and touching his hands to the floor. He had a poker spine at the beginning of treatment. This is not an accident. It is not one swallow that makes a spring. I have got a flock of such swallows.

When one attempts to write or talk on this subject there are many practioners who do not understand it. They cannot understand why it is you have to spend hours to find the original source of infection. Such men are superficial, and they do not examine their cases as carefully and as thoroughly as they ought to. They will hastily remove the tonsils and teeth; they will hastily remove the appendix and drain the gall bladder. I have a woman in the hospital now whose gall-bladder has been removed and appendix taken out to see whether it would help her chronic arthritis. In these cases unnecessary operations are done, and the patients are turned loose who have arthritis and told they will get well, without the removal of any of the secondary foci, and most important of all, proper management.

Dr. Preble has told you that he thinks vaccines are useless. I will not go quite that far. I suppose that all of you know why we use vaccines, therefore I will not take much time in telling you about some of the principles governing the use of them. If you suffer from an acute disorder or an acute fever, the defences of your body are at once aroused by the invading organism and there are formed in the blood and in your tissues defences—anti-bodies, and others, as we call them. They are called forth to fight the invading organism. They occur in the blood stream

and in tissues because the invading organism has gained access to the blood.

In many diseases we have spontaneous recovery in the majority of cases because the defences of the body finally overcome the invading organisms, and we get well. It happens in almost all acute disorders, that if you give vaccines of the like organism obtained from the individual's body you may produce a like result. But it is the consensus of opinion that the use of vaccines in acute disorders is not justified because the human body with its anti-bodies or other defences is making all the effort it can against the invading organisms that are present, and to head off the dead ones does not help. A patient may suffer from a chronic disorder so long that the defences of the body are exhausted, and there is therefore upon that principle a rational use for a vaccine to stimulate the anti-bodies to fight the organisms that are at work within the body. So it has been proved in certain forms of tuberculosis, that when the individual's defences are down, if tuberculin is injected into that individual it will arouse his defences to some degree, and the same is true of vaccines when used in other chronic disorders. But unfortunately, because that is true more or less, there has come into our country a commercialism in the use of vaccines that is irrational, and because they are widely and irrationally used it is absolutely criminal the way they are employed. If there is any good in the principle of a vaccine in stimulating the defences of your body because of the use of that vaccine, it should be of the same bacterium that is invading you, otherwise it cannot do it. Therefore, you must use an organism obtained from the infected patient to do it, otherwise you are using an organism that you do not know anything about. You have got to make a bacteriological examination and make a diagnosis of a chronic, pathological condition in the patient before you can use a vaccine rationally, and then you should use what we call an autogenous vaccine. You must consider the patient's condition and everything else.

Vaccines are used in the chronic arthritides. On account of the notoriety I have gained from the use of vaccines, patients come to me from all quarters of the globe. Some of them are brought on stretchers with bony ankylosis of every joint in the

body, expecting me to loosen up their joints and make of them circus riders. I venture to say, ninety per cent of the patients who come to Chicago for that purpose have had either vaccines or phylacogens used upon them, not autogenous but commercial stock vaccines. Practitioners are not satisfied with using a streptococcus vaccine, but they use every vaccine you ever read about. They make use of mixed vaccines, and expect patients to improve. That sort of vaccine use is absolutely criminal. The man who uses them is so ignorant that he does not know what he is doing, or if he is not ignorant, he ought not to have a license to practice medicine or dentistry.

I have just said that I believe the chronic arthritic patient suffers from all of these dangers because he has a hematogenous infection which produces embolic processes in all the tissues infected. It produces obstruction of blood vessels, cuts off a part of the circulation, so that there is malnutrition. If you use a vaccine and expect to do anything for such a patient it is necessary to rid the tissues of organisms, and manufacture antibodies in the blood stream and send them to joints and tissues that have obstructed circulation. But you may not get any benefit when you use them. That has been my experience. You do not get much out of vaccines in the management of these patients in the earlier stages. I have cured them by building up their defences, not with vaccines, but with the other methods I have mentioned.

Finally, I think we have to look at this whole subject rationally. You in your work as dentists and as oral surgeons have got to be sane. The throat men have got to be sane. The general clinician has got to be sane when he comes to his patient, and if I have a patient who has some alveolar infection I shall send him to you and ask your help in the correction of the condition. I must not say to you, "I want these teeth out," because I do not know anything about it. I do not know how to treat the teeth. You ought to know. You ought to find a way by the most approved technic of saving these teeth if you can, and not pull them out. I do not know whether you can save them or not, but if it can be done, it ought to be done. The human machine ought to have sound teeth. He ought to keep them if he can. It is the same way with the tonsils. I depend

upon men who are qualified to tell me whether or not the tonsils are infected, and whether they should be removed. When all these things are attended to we will manage the rest, but we have got to be sane about it all.

I have patients sent to me to be treated for chronic arthritis when they do not have it. They have had pain and have been shot full of phylacogens and vaccines. Patients come to me every week and say they have been told I am a specialist in rheumatism and they want me to look them over, and instead of finding joint trouble, I may discover something else. We must be sane and rational, and we must be careful to treat the poor patient as we would want to be treated ourselves if we were so unfortunate. (Applause.)

DR. ARTHUR R. ELLIOTT:

I would deprecate the tendency that is apparent of making this theory of the focal infective origin of systemic disease rather too broad; in other words, a blanket to cover diseases of obscure origin regarding the etiology of which we have always been more or less ignorant. This is due to the fascination with which we have observed the development of this work in the hands of Dr. Billings and his co-workers and the gratification we have experienced, all of us, in seeing case after case freshly vindicate these ideas in their clinical application to inflammatory painful disorders. When the theory, however, is carried over to include chronic dystrophies, chronic arterial degenerations, it rather stretches one's credulity. When the theory of focal infection is advanced as an adequate etiology to account for such diseases as arteriosclerosis, high blood pressure states generally, chronic interstitial nephritis, diabetes, chronic thyroidism, we may be neglecting other considerations of greater importance, such as syphilis, the abuse of alcohol and tobacco, the wear and tear of life, persistent over-strain of various kinds, etc. It is perhaps possible focal infection may give rise to such a lesion as chronic interstitial nephritis or contracted kidney.

As an illustration of such a possibility, I may mention a case I have had under observation of a young man who has pus in both maxillary antra. During the time I have had him under observation he has had three attacks of subacute glomerular nephritis. If the antra are not cleared out and kept clean, repe-

tition of this subacute toxic insult to his kidney may in the course of time produce fibrotic lesions in the organ constituting contracted kidney.

I wish Dr. Billings in his remarks had said something more about dental sepsis and its effects upon those tissues which we are in the habit of associating with dental sepsis, namely, the joints and nerves. I am a humble seeker after knowledge in this field. During several years I have tried from time to time to localize lesions in the alveolar processes, about the pulps of teeth, and in pyorrhea cases, and have followed them up therapeutically with the co-operation of oral specialists, but I regret to state, perhaps largely through my own fault, I have not experienced uniform success, although occasionally I have been gratified by the results of such measures.

Stimulated by the increased interest in this particular phase of the subject under discussion, I am now making it a rule to radiograph and examine technically, with the assistance of dentists, the jaws and mouths of patients with obscure systemic diseases, and although I have not very much of a record to make, I should like to recount as suggestive the experience of the last few weeks.

Since the first of December, in routine office practice, which does not include any special draft from this order of diseases, I have been able to identify dental sepsis in nine obscure systemic diseases. Tabulated, there are two cases of spondylitis, three cases of chronic arthritis (two of these of the progressive deforming type), two cases of chronic neuritis, one of myositis, subacute in type, and one of persistent toxic erythema. An interesting thing about the identification of the foci in these cases is that in all of them disease of the alveolar processes and tooth roots furnish the only available etiology, and so far as my skill would enable me to determine, there was no other etiology in these cases. Some of these cases have been operatively treated, others have not. In all of them it is too soon to appraise the results. Whether the foci of infection furnish the true etiology in these cases I cannot say, but it is an interesting and suggestive fact that they constitute the only available source of etiology in the cases mentioned.

One case interested me particularly. It was of an individual

who for five years had chronic neuritis of the brachial system on one side. Repeated examinations failed to determine the cause. Recently he developed a grating in the right temporo-maxillary joint on yawning and widely opening the mouth. This attracting his attention, he reported for re-examination and a roentgenographic examination of the jaw on that side revealed a root abscess in an upper bicuspid. This interested me particularly because it is the same character of lesion as in a case reported by Camac in the *American Journal of the Medical Sciences*. This patient had a painful affection of the ear. He complained of some crepitation in the temporo-maxillary joint, and a roentgenographic examination of the jaw disclosed a lesion at the tooth roots.

With reference to Camac's article, I would like to ask Dr. Billings and members of the society whether their experience is in accord with his statement, that lesions about the tooth roots of the upper jaw give rise to chronic arthritis frequently, whereas suppurating cavities in the lower jaw result in adenitis and pus burrowing, and not in chronic systemic reactions.

I have been edified to see the excellent roentgenograms thrown upon the screen by Dr. Best. In my experience a radiographic examination of the jaws is not very gratifying. The work does not seem to conform to the high type that we would expect from our medical experience. Prompted by certain remarks made to me by dental friends, I think we may fall into error in accepting too technically an interpretation of roentgenograms in the diagnosis of infected teeth.

In my own work I find the interpretation of a roentgenogram is to some extent a matter of personal judgment. In chest work, in bismuth roentgenography of the gastrointestinal tract, in cranial roentgenography, you may take a plate to a number of experts and get a different interpretation in some detail from each one; consequently, we ought not to be dogmatic or too arbitrary in accepting interpretations of roentgenograms, but as Dr. Best has advocated, accept them only in connection with the clinical findings. After all, no laboratory method is a substitute for clinical diagnosis, and until we realize that and accept the laboratory evidence only as a part of the diagnostic criteria, will we be able to safeguard ourselves against error.

One very fortunate outcome of this work upon focal infection as related to the mouth is the drawing together effect it has had upon the medical and dental professions. Anything that will get us together to meet on a more intimate or common ground is to be welcomed. It is desirable that physicians learn more of oral pathology in order to better appreciate pathological conditions in the mouth and to acquire sufficient observation and skill to detect the grosser lesions that we find in and about the teeth. It is also quite desirable that the dentist possess enough medical knowledge to inform himself regarding the effect of systemic states upon the teeth themselves, since not only do teeth conditions give rise to systemic reactions, but systemic conditions give rise to teeth reactions, and many of the cases of pyorrhea the dentists see associated with systemic conditions are not the cause but the effect of the systemic conditions.

Just recently I had a patient with diabetes whose teeth had been radically treated by a dentist, and who died two weeks after the dentist had finished with him. Within that short time he was treated for pyorrhea alveolaris, and much bridge work in his mouth was nicely fitted to him for the sole purpose, as it proved, of wearing it after death. It is needless for me to say to anyone who knows anything about diabetes in the stage of acidosis, that prolonged painful dentistry, with the interference with nutrition incident to sore gums, will not do the patient any good. A better knowledge of the medical aspects of mouth conditions is desirable on the part of the dentist the same as a better knowledge of dental conditions is desirable to the medical man.

In this matter of close co-operation and interest the medical profession should realize that a good oral surgeon is capable of doing a high class kind of surgical work with the same technical excellence that characterizes modern surgical work in other fields, and in surgery of the mouth and the treatment of infected teeth the operation of election should be left to his choice. (Applause.)

DR. HOWARD R. RAPER, Indianapolis, Indiana:

I only have a word or two to say, and I am going to make everybody hear it or bust in the attempt. George Bernard Shaw once said, when he came at the end of a program, "The subject is not exhausted, but the audience is." Acting upon that as-

sumption, I shall make no attempt whatever to discuss the matter, because I could not do so without making myself misunderstood.

George Bernard Shaw also said once, possibly twice, that it was no trouble to make a man say when he had something to say, but the trouble was to keep him from saying it. I would really like to say something, but I will not in consideration of the feelings of a tired audience who must still listen to the two men who are to close this discussion. It would be rude of me not to pronounce the name of Dr. Best just once, anyway, so I will go through with that form and say in reference to the advice he has given us, quoting Dr. Charles Mayo, of Rochester, Minnesota, who spoke at a recent meeting of this society, "Will we take it?"

If the Chicago Dental Society wants to know what I think about this subject they will have to give me another chance. Personally, I am very grateful to Dr. Best for his activity. Every man who acts does me good, and does the profession of which he is a member good. I thank you.

Dr. J. R. Callahan, of Cincinnati, exhibited numerous stereopticon slides of root fillings.

DR. BEST (closing the discussion):

I only have the same admission to make that Dr. Callahan makes: We do not fill the roots of all teeth, but we do the best we can.

ODONTOLOGICAL SOCIETY OF CHICAGO.

A regular meeting was held January 12, 1915, with the president, Dr. E. A. Royce, in the chair.

Before Dr. J. E. Hinkins read his paper entitled "Hydrolysis of Triacetyl Glucose by Enzymes," Mr. M. T. Hanke, of the Chemical Department of the University of Chicago, was called on and made the following remarks:

MR. M. T. HANKE:

Dr. Hinkins, in his preliminary remarks, did not tell you that triacetyl glucose is really another representative of the class of substances that we term fats. Triacetyl glucose is an ester of acetic acid and the alcohol glucose. You do not think of glucose as being anything but a sugar, but all sugars are also alcohols.

Triacetyl glucose is an ester, and since all esters are fats, these findings of twelve years ago apply not only to triacetyl glucose, but to fats in general. Before I tell you something about the chemistry of enzymic action, I will say a few words about fats in general.

One of the constituents, which a great many people deem most important as a constituent of the body is fat. Some people think that to be fat, is to be strong. They try vainly to acquire fat. The stout people, strangely enough, are always seeking a reducing agent. I will tell you something about acquiring fat. The people who take on the largest quantity of fat do not possess enough of a certain kind of enzyme that is normally found in the body. We all have two kinds of enzymes in the body that act on fats. One enzyme oxidizes the fat, burns it up quickly into carbon dioxid and water in a healthy person. Intermediate products, such as oxybutyric acid, aceto-acetic acid and acetone, are found under pathological conditions. If the person in question does not have a large enough amount of that particular enzyme, he will not oxidize fats, and we find some people grow stout because they cannot oxidize fats. If they stop eating they would soon get thin. But just as soon as they start eating again the fat accumulates, because not only sugars, but fat, is deposited as fat in the body. Such people have storehouses of energy. If they were taken out onto a desert island, where they could get nothing to eat, along with a lean person, the lean person would soon die and become food for the stout man. The person who is stout has stored up energy and can live a long time without eating. Certain animals also use fat as a storehouse of energy. The female polar bear gets her young during winter, and whilst getting her young does not roam around like many females do. She isolates herself in a quiet place and eats nothing. One would think that she must die. Our common experience with people that refuse to take food, is that they soon pass away. The bear, however, is far from dead. She is perfectly quiet, to be sure, moves perhaps only a few times throughout the whole winter, but nevertheless, she shows all the other signs of life. She breathes, her heart beats, and slowly but surely she is becoming a mother. The great question is, how can this bear live throughout the whole winter without food? We can answer this ques-

tion by watching the bear before the hybernating time comes. During the preparation period, she gorges herself with food. Since she eats entirely too much for the simple sustenance of life, the excess of food, both carbohydrate and fatty, is stored as fat. If the bear is examined just before she goes to rest, large pieces of both soft and hard fat can be seen running criss-cross through various parts of her body. This fat acts as a storehouse of energy. During the hybernating season, the bear does not eat, it is true, but as strength is needed, the body gets it from the stored fat:

We have three animals very near home that do exactly the same thing. The frog, before he crawls into the earth for the winter, eats an enormous excess of food, this excess being stored as fat. During the winter, the frog lives on this stored fat. The goose and the pig are two other very good examples of fat-storing animals. We can fatten a goose or a pig for the market in a very short time, just by feeding an enormous excess of food. The excess of food is stored as fat, because all of these animals lack the necessary amount of the oxidizing enzyme.

All animals also possess another kind of enzyme that is usually known as a hydrolyzing enzyme. It is this enzyme whose properties were discovered twelve years ago, in connection with the work on triacetyl glucose. If an animal eats fat, the fat eventually reaches the intestine unchanged. To be of any use to the animal, this fat must diffuse through the intestinal wall. Fats, however, will not diffuse through the intestinal wall. Nature has provided for this possibility by placing an enzyme in the intestinal juice that can split fats into their elementary constituents, namely, glycerine and fatty acid. This same enzyme is not specific for any one kind of fat, or ester; it will split any ester into the alcohol and the acid of which it is built up. The alcohol so formed is soluble in the intestinal wall, and diffuses through. The acid as such is not soluble either, but it is immediately neutralized by the intestinal juice, which is alkaline, forming soaps. These soaps are also soluble in the intestinal wall and can diffuse through. But now we no longer have fats. How do the fats appear in the body? Evidently, the glycerine and the fatty acid must be recombined in some way to give back the fat that we started with. This recombination occurs in the

intestinal wall itself. The agent that recombines the alcohol with the acid is perhaps the same kind of an enzyme that split the fat into these products. This, then, is a reversible reaction.

Just what part does the enzyme play in these reactions is a question that has puzzled chemists for a great many years. The question is still open; but we can at least, at the present time, present a theory that gives a fair account of the reaction. Men used to view enzymes with great respect. They were strange, inexplicable creatures, that seemed to possess a superior intelligence. For many years it was held that they were alive. Then one man succeeded in isolating a perfectly dead substance that had all the properties of the so-thought live substance. If the thing is dead, how can it possess such strikingly alive characteristics. For many years this strange behavior has been seemingly explained by saying that the enzymes were catalytic agents. That term catalytic, as Dr. Nef says, is a term invented by chemists to denote their ignorance. The term is meaningless. The best men today think that when an enzyme acts it forms an intermediate compound with the substance upon which it acts. To understand this clearly we must first consider what an alcohol is, and then what an acid and an ester is.

Any alcohol can be represented by the general formula $R-OH$. R stands for a radical containing carbon. Thus ethyl alcohol, the ordinary alcohol of commerce, has the formula C_2H_5-OH , where C_2H_5 is the R . The characteristic of the alcohol is, then, that it contains an OH group bound to carbon. Some substances contain more than one alcohol group. They are more than once an alcohol. Thus glycerine has the empirical formula $C_3H_5(-OH)_3$. It is three times an alcohol. Glucose has five alcohol groups in it, hence glucose is five times an alcohol. All alcohols split during molecular collision into a positive

The carboxilic acids all have the formulae $R-C=O$. In this



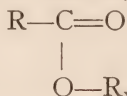
case, R is again some radical containing carbon. Thus the H atom, and a negative rest. Hence, all alcohols are acids.

formula for acetic acid is $\text{CH}_3\text{—C=O}$. These acids also contain

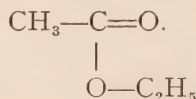


the OH group, hence they split off positive H and are acids. They also contain another group, the C=O group, which is responsible for the whole phenomena of enzymic action. This shall be made clear later.

Esters have the general formula,

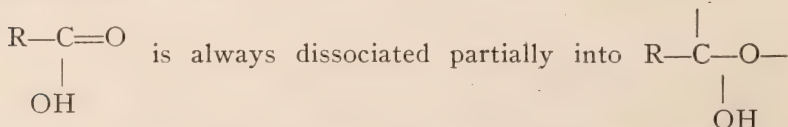


where R and R_x are again radicals containing carbon. The radicals need not be the same. The formula for ethyl acetate is, for example,



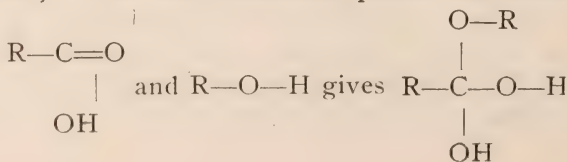
We notice again that this ester also contains the C=O group. Hence, any reaction that the enzyme may show with the ester, it would also show with the acid, if the reaction were due to this C=O group.

If we boil a mixture of an alcohol with an acid for a time, a certain amount of ester is formed, together with water. If, on the other hand, we boil a mixture of water and ester for a time, we get an alcohol and an acid formed. This, then, is a reversible reaction. It goes both ways. Below are given the equations of this reaction.

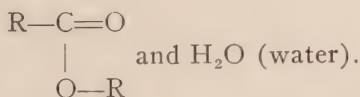


giving a negative hook or valence free on the oxygen item and a free positive hook on the carbon atom.

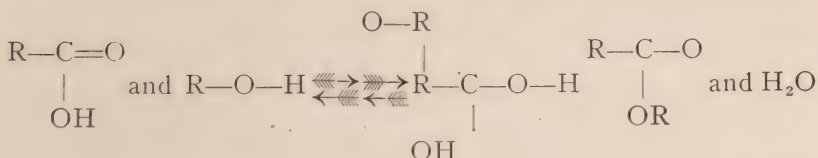
R—OH is always dissociated into R—O— and H— (the H being positive). The two dissociated pieces then unite to give



This new molecule readily loses water, as shown by the solid line, giving



If we were writing this equation all in one piece, it would be,



In the last equation we have arrows pointing in both directions. This means that the reaction goes both ways. If we start with the acid and alcohol, we get an ester and water. If we start with the ester and water, we get the alcohol and the acid. The water addition product in the center of the page is the turning post in the reaction. When it is formed, we get either the ester, or the alcohol acid mixture, depending upon which way the compound breaks up. If it loses water, as shown by the solid line, an ester is formed; if it loses alcohol, as shown by the dotted line, a mixture of alcohol and acid results. The ester forms this water addition product by adding H_2O at the $\text{C}=\text{O}$ group.

There is one thing that immediately strikes us as imposing. The success of both of these reactions depends upon the opening of the $\text{C}=\text{O}$ group to $\text{C}-\text{O}-$. If this group remained closed,

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neither water nor alcohol could be added. Then from the ester we could get no acid and alcohol, and from the acid and alcohol we could get no ester.

In preparing the ester, we must *boil* the acid with the alcohol. In hydrolizing the ester we must *boil* the ester with the water. Why boil? When we heat either the acid or the ester, we increase the concentration of the *open* $\text{C}=\text{O}$ groups. That is, the boiling forces this group farther open than it is in the cold. The active agent is this open $\text{C}-\text{O}-$ group. Hence, we get

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quicker action on boiling simply because we get more open C—O— groups.

In the body, however, acids and alcohols react to give esters at ordinary temperature. Also esters give acids and alcohol at ordinary temperatures. Why don't we have to boil these substances in the body to make them react? In the body we have this enzyme that *takes the place of the boiling*. We saw that boiling simply increased the number of open or active C—O— groups.

The enzyme probably does the same thing, as given below.

It becomes probable, from certain investigations, that enzymes can be considered to be En—O—H. These En—O—H's are dissociated into EnO— and H. We can class our enzymes as alcohols. Such a compound can react with open =C—O— groups, giving

$$\begin{array}{c} \text{=C—O—H.} \\ | \\ \text{O} \\ | \\ \text{En} \end{array}$$
 We have introduced a molecule whose atomic weight may be 5,000 grams into a molecule having a very small atomic weight. This always produces a very serious disorder somewhere.

In this case the new molecule is extremely unstable. With great violence the EnOH is thrown off. The C—O— group

from which the EnOH has just dropped off, is left for an instant palpitating with rage, if you will. The two valences, one on the oxygen, the other on the carbon, are widely separated. In short, the already *open* C—O— group is cast *very wide open*.

While in this condition other molecules can be absorbed, and we can have the acid absorb the alcohol to give the central product shown on a previous page, or we can have the ester absorb H₂O to give that same intermediate product.

Now we only have one question left to answer. Since we get the same intermediate product whether we start with the ester or the acid alcohol mixture, what determines how this substance shall decompose?

In other words, what determines the end product that we get. This can be easily answered popularly. This intermediate product breaks just as many times one way as it does the other.

But if we start with much ester and water, and no alcohol and acid, the tendency is naturally to go to a condition where we get equal amounts of all the reacting substances. This is exactly true.

We can now apply this very briefly. Pure fat reaches the intestine and is mixed with intestinal juice containing this enzyme. It tends to give an equal mixture of water, fat, glycerine and fatty acid. But the glycerine and fatty acid escape through the intestinal wall. Hence we can never get an equal mixture till *all* the fat is broken into glycerine and fatty acid.

In the intestinal wall we again encounter Lipase. It unites the acid and glycerine, again endeavoring to give equal mixtures of all the four reacting substances. When the *fat* is formed in this case, it diffuses through the fatty membrane of the cells and escapes into the lymphatic vessels. The glycerine and fatty acid, as soap, can not so diffuse. Hence the lipase acts on the acid and glycerine to form fat until all the acid and glycerine are converted.

So far my discussion seems to have little bearing on triacetyl glucose; but this substance is an ester just as fats are esters. It has been found that lipase will act just the same on any ester. Hence what was said regarding fats in general applies also to triacetyl glucose. Dr. Hinkins, I believe, was the first man to show, perhaps unsuspectingly, that lipase, the fat hydrolyzing enzyme, is found in a great many very scattered localities. He found it even in saliva for at times triacetyl glucose was demonstrated to be present in saliva. The importance of this finding is only now being fully appreciated. Lipase is scattered *all over* the body. It also shows us something of the character of an enzyme. We would hardly expect to find a molecule having exactly the same constitution in a plant seed and in a man's intestine. Nevertheless the substances will both act on fats in exactly the same way. This seems to indicate that our so called enzymes may be merely some protoplasmic constituent that acts perhaps chiefly as a replenisher of body protein, but also, on the side, confers small favors on the animal by splitting and reuniting fats.

Dr. J. E. Hinkins then read his paper entitled "Hydrolysis of Triacetylglucose by Enzymes."

DISCUSSION.

DR. H. H. SCHUHMANN:

I am very glad you have a member of this society who is sufficiently interested in a topic of scientific importance such as this to spend so much time on it. It would be presumptuous on my part to try to enter into a discussion of such a deep subject related to chemistry in the presence of a man like Prof. Hanke who is an authority on such a subject. I am sorry the paper did not contain more with reference to physiological chemistry because that would have been more interesting to most of those present. This paper goes into real scientific chemistry so deeply that a good many of those present are not familiar with it. I am sorry also that more time was not spent in discussing the principles of hydrolytic splitting of the polysaccharides and starches in our system. I do not think I can add anything of that nature to the discussion, because it would not be courteous to the essayist for the reason that he did not think best to include it in his paper. The knowledge we have obtained in the last twelve years (that is since this paper was written), concerning the action of hydrolysis and enzymes, has proven that what these gentlemen found out at that time was correct in many respects. The fact that a rise of temperature causes enzymic hydrolysis to go on more rapidly is now a well known fact. At the time these gentlemen did their work more experiments were necessary to find out whether that was a fact or not, but it is now accepted, and we do not have to go through such a tremendous amount of work as these men had to go through when they prepared the paper that has been read this evening.

I cannot add anything more to the chemical reactions which have been shown so beautifully on the blackboard by Dr. Hanke.

I wish some one would say a few words on the physiological action of the breaking up of carbohydrates if it meets with the essayist's approval. We all know that the polysaccharides are broken up in our system by the absorption of water, and are thus broken down into simple saccharids. Cane sugar in our small intestine is broken up by hydrolysis and by enzymes, such as lactase, and is broken down into simple sugars such as glucose and dextrose. Most of the carbohydrates we take into our systems are taken in in the form of starches, not as cane sugars. We

also know our systems are accustomed to taking care of 500 grams of starch in twenty-four hours. That is broken down by the different enzymes, like ptyalin, diastase, maltose, until it finally reaches the stage of glucose or dextrose which is absorbed. Glucose and dextrose are absorbed from the intestine into the portal circulation and thrown into the liver, and from the liver is so liberated that a sufficient amount of dextrose is thrown out into the mesenteric circulation and from there into the circulation to supply the wants of the system. The amount of dextrose which is thrown out is usually about 0.15 per cent. blood weight. The balance of the carbohydrates is stored in the liver as glycogen for future use. If we take in too much starch or too much carbohydrates, so that the liver cannot take care of them, they go further along into the intestines and by various enzymes are broken up into different acids, such as acetic acid, buteric and succinic acids.

DR. SYDNEY J. KNOWLES:

I cannot add anything of value in discussing this paper. There are certain parts of it I can understand after a fashion. Two years ago I probably would not have appreciated any part of it, but now there are certain parts I can. The thing that occurs to me is the fact that here are two men who have been working on a subject with the idea of finding that in the body there are certain actions going on and of finding out why they go on. This is something the profession is going to do more and more in the future, not taking things for granted, but prying into the whys of these things.

Prof. Hanke has given us an interesting talk by means of symbols from the standpoint of a chemist, and then Dr. Hinkins in his paper told us that certain transactions took place in these compounds which are enzymes. I really never have appreciated until tonight just what an enzyme meant as well as I think I do now. I cannot say that I know a great deal about it—in fact, very little, but the thing that impressed me in regard to enzymes is that an enzyme is something that acts on these compounds to bring about an action producing these things. Men are going to work on this question and have worked on it, and certain definite results will follow. The chemistry of the mouth is so complicated that it is beyond my comprehension, but I believe we are going to learn and we ought to know about it. It makes me appreciative,

after hearing this paper and seeing these symbols written on the blackboard, how much men like Black and Miller, and men of that type, have worked in connection with erosions and things of that sort. They probably had under investigation years ago such things as the action of the enzyme and of ptyalin in the mouth. The enzyme is a thing we are very much interested in, so that if it does not do any more than make me know more about it, I feel that I have been very well repaid for listening to this very interesting paper.

DR. C. N. JOHNSON:

Dr. Schuhmann has intimated, and very wisely, that probably most of this paper was Greek to the majority of men here, and I think that is true. Much of it was Greek to me, and still I am impressed with one thing, and that is the fact we have men in the profession and out of the profession who are delving into these problems to throw light on the things that go on in the human system. I hope the day may come when we will have a better and keener knowledge of all those processes which interest us in health and disease.

I want to express to the distinguished gentleman who has come here tonight and aided Dr. Hinkins in the presentation of this subject my sincere thanks. He has cleared up some things to me that I did not know before. No longer ago than Sunday a gentleman that we all know, Dr. William Bebb, was talking with me about the thing Professor Hanke has mentioned tonight, and that is the hibernating of animals and the processes that went on in the sustenance of life during hibernations. Dr. Bebb made the remark to me that he had never seen a clear explanation of that phenomenon, although he had read various works. I am very sorry indeed Dr. Bebb was not here to have listened to the statement of that fact by our distinguished guest, Prof. Hanke.

DR. TRUMAN W. BROPHY:

I must confess, I cannot discuss this subject in the manner I would like to. I feel we should as a society deal more with the subject that has been under discussion this evening.

When this society was organized, it was for the purpose of engaging in original research work. Dr. Kester, Dr. Ames and myself are the only original members. This society has done a great deal of work that has been to the advantage of the pro-

fession, and for the work in this particular field we have looked to Dr. Hinkins and to our late departed friend, Dr. Cook, for information. The work they have done in the last few years has been greatly to the benefit of the profession and the people, and I cannot say too much in praise of the men who have done it. It has remained for Dr. Hinkins to take up the work quite alone since the passing of Dr. Cook, and he has done it well. I have always enjoyed his work because I know that he has been a sincere and an earnest worker, and what has been to his credit is that he has sought the assistance of men who are masters in this special field, in evidence of which we have one with us this evening whose knowledge of the subject is most thorough. What has been done in this special field of chemistry will be elaborated, I am sure, so that we will all find it has a real practical bearing.

Look in the field of bacteriology. At first, we looked upon it as something quite apart from our needs, and yet when we have informed ourselves fully regarding it we realize its practical application.

I trust we may have another paper before long from Dr. Hinkins which will be along the line suggested by Dr. Schuhmann, giving the physiologic aspects of the subject and the practical application. In doing this we will find in it much that can be utilized, especially in the care of the mouth.

I remember very well a few years ago it would have been impossible to have enlisted the attention and time of distinguished chemists to present anything to a society of dentists. The average chemist looked upon dentistry as something rather foreign to his mission and his work. This work, it seems to me, can be brought to the practical use of every dentist. It certainly would be if it were known to him, and I will expect Dr. Hinkins to do that.

DR. J. E. HINKINS (closing):

I wish to thank the members for the kind treatment and things they have said about me and my work. I do not feel worthy of them, but I have carried on this work because I felt it was my duty, and I have always been happy in availing myself of the assistance of members of the chemical profession. When I went to the University of Chicago to seek assistance, they gave it freely and bounteously, and I had to assimilate their advice and knowledge the best I could.

Dr. Acre of Johns Hopkins University and myself have found in the saliva, acetic acid, formic acid, etc., but I am sorry to say that we have never found lactic acid in the mouth, yet the late Dr. Miller said that it was the cause of decay of the teeth in over 50 per cent. of the cases. We can produce decay of the teeth artificially by lactic acid, and out of two hundred and fifty mouths that I have tested for lactic acid, we could trace it down to $.001/12$ of 1% of an acid. I have tested mouths where we had $1/4$ or $1/6$ of one per cent. in the saliva, taking acetic acid as a base. Dr. Miller stated in connection with his work that from the saliva he was able to isolate 126 different varieties of bacteria in the mouth, and as to the enzymic action of these different bacteria, I do not think I am going too far, when I say that each bacterium has its own enzyme. When you take them in combination with the carbonaceous foods and protein compounds, also considering the changes of atmosphere, heat and cold, pressure, etc., we have really a hotbed of infectious conditions in the mouth. It is a very complex condition to do anything with. I have worked hard on this subject, and it has been gratifying to me to say that this paper was well received in the chemical world some time ago. I have been working in this field with Dr. Hanke, who gave us lectures on sugar, and I was told that it was time for me to present this paper to the dental profession. I have no apologies to offer for it. I wish I could do more. It is a paper we have been working on for many years.

I have tested my own urine once a week for two years, have titrated it against $1/10$ normal potassium hydrate for acidity, using phenolphthalein as an indicator, found the specific gravity and amount to be about normal, and have studied my diet, and have found that I can control the chemical properties of my urine almost absolutely from an alkaline to an acid condition by diet. At the time I was making the above test I also tested my saliva. I took five c.c. of saliva and made the tests in the evening. While I was doing that every week when I was at home, I titrated that against $1/10$ normal potassium hydrate, using the same indicator and found it was exceedingly difficult to do anything with the acid condition of my saliva. It was changing. While under great nervous strain, I found that my saliva became excessively acid, and at that time, erosion began. After relaxation from this

nervous tension, the acidity of my saliva dropped down to $\frac{1}{5}$ of 1 per cent. of acetic acid, but the erosion of the teeth had gradually gone on. I have tested in my own practice about twenty-seven patients who have erosion of the teeth, and I have found in each mouth, the saliva was very acid. I also found in these mouths that the secretions from Steno's duct were acid. It was this acid condition of the saliva in the mouths of so many patients that prompted me to take up this work and to carry on these investigations.



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EDITORIAL.

DENTAL RED CROSS.

In our March issue we published a statement from the committee of the American Institute of Dental Teachers, setting forth the objects of the committee in raising funds to be used through the Red Cross Society for the purpose of aiding the wounded soldiers of Europe whose injuries require dental treatment. We wish particularly to call attention to this movement at the present time. In no war of history has there been such a predominance of wounds about the face and jaws as in this. The method of fighting from trenches, whereby only the upper extremities are exposed to the enemy's fire, has resulted in nearly all the wounds being inflicted in this region. In addition to this in no previous war has the significance of dental service for the soldier been so prominently emphasized as in this. Government and military authorities are awakening to the fact that soldiers cannot march well unless they are fed well, and that they cannot eat well unless they have the equipment with which to do it. In the physical examinations for military service the condition of the mouth and teeth is looked into very carefully, to the end that the work of the dentist is being more prominently brought before the world than ever.

This would seem to be a time for the dental profession to be most alert as to its opportunities. The relief of suffering by means of dental service among the soldiers will leave an impression which no amount of writing or talking would ever accomplish. It is demonstration which, after all, counts most.

A recent letter from a dentist in France who is doing much to aid in the dental hospital service tells the editor of this journal that the demands for dentists in the army service are vastly in excess of the supply; and he adds: "One dentist for each five hundred enlisted men is none too much."

And yet it is safe to say that never before has the fighting soldier been so well looked after in a dental way as are the soldiers of Europe today. Inadequate as the present service is it is vastly in advance of that of the past, and it remains for the dental profession to lend its aid as best it can to extend the good work beyond its present limits. We cannot all go to the front and help take care of the injured, but we can raise funds to see that the effort being made by those who are in the service is more widely extended and rendered more efficient.

The plan of raising money for the Dental Red Cross is by means of issuing booklets, each containing twenty certificates, beautifully engraved and selling for 25 cents each certificate. The idea is for dentists and dental students to take these certificates and sell them as extensively as possible to the public. The certificates are really beautiful in design, and they will do much to bring to the attention of the public the fact that dental service is of major importance in the efficiency of the soldier, and that the profession is fully alive to its opportunity in the relief of suffering from dental ills. There is surely not a dentist any place who cannot dispose of at least one of these booklets containing twenty certificates. Many can probably dispose of more than one, and if all of us work with a will we shall send a sum to the Red Cross Society which will not only be the means of relieving distress but we will thereby demonstrate to the authorities that our profession is fully abreast of the world not only in efficiency but in philanthropy. These booklets may be had by addressing the chairman of the committee, Dr. C. R. E. Koch, 31 West Lake Street, Chicago, Ill. Let us snow Dr. Koch under with requests for booklets. He will cheerfully dig his way out.

THE EDITOR'S DESK

ABROAD IN WAR TIMES.

ANOTHER VACATION STORY.

(Continued from the March Issue)

LONDON.

The difference in national characteristics between the French and English was well illustrated by the difference in their behavior in war time. In Paris, as I have said, all was frenzied excitement—the air was surcharged with it. In London, while there was intense feeling, there was little expressed excitement. They went coolly, and it seemed at times almost too slowly, at the preparations for war.

The morning after our arrival we saw from our hotel windows company after company of soldiers marching across London Bridge, and the whole atmosphere of the city was one of calm preparation for a gigantic struggle.

We found London rapidly filling up with refugees of war, largely Americans and Canadians. To get to London was to be safe, but better yet, to get out of London and back to America—that was the real achievement. And there came the rub—which I shall speak of later.

We soon began to learn from those who came in from Paris after we did how close a call we had. As I have already said, none of those who waited got their luggage, and some of them had a very trying time. One gentleman and his wife and daughter reached London without a bit of luggage, not even hand grips. The only wearing apparel they possessed were the clothes they had on.

The big Hotel Continental which was swarming with help when we went there had only two men in the dining room a few hours after our departure. The elevators were stopped for lack of men and the bell boys were gone, so some of our friends had to carry their luggage down the stairs themselves. One American friend had a peculiarly trying experience. He re-

mained till the following day and then learned that he could not leave Paris without a passport. The place for issuing passports was naturally crowded and he had to stand in line for nine hours in order to get his passport. He felt relieved to secure it, and showed it to the hotel proprietor as a document which was very precious to him. "Yes," said the proprietor, glancing at it, "this passport enables you to *remain in* Paris, but not to *leave* Paris." So the refugee had to do the whole thing over again. The rush to cross the channel from the continent to England became so great as to overtax the capacity of the boats. One boat which was supposed to carry 475 passengers had 2,000 on, and there was scarcely standing room. Coupled with this uncomfortable condition the boat was on the channel 19 hours, being repeatedly stopped and held at anchor. Naturally there were no accommodations on the boat for such a crowd and even the drinking water gave out so the passengers had nothing with which to quench their thirst.

The frenzy of war was well illustrated by the stories told by refugees from various sections affected by the conflict, and some of these stories were not pleasant to listen to. It is not my purpose to consider them at this time except to say in all fairness that people coming out of France were for the most part treated civilly and with consideration. Of other places I have no personal knowledge.

I felt sorry for the women and children who were caught in the scramble from the continent, and yet it will usually be found that they adapt themselves to circumstances and accept the inevitable more graciously than men. One gentleman in London related his experience in getting over to England during which he and his wife were on a train 36 hours without a seat. To keep awake for this length of time was hard enough but to stand on a crowded train without the smallest chance of sitting down was torture. And yet his wife did not complain as much as he did.

The officials were in the habit of running a passenger train to the boundary line, and then ejecting all the passengers and taking the train back to convey troops. One instance was related to me by a man on board ship coming back. Said he: "Our train came to a stop and we were ordered out. There was no

station in sight and we were simply dumped like a lot of freight by the side of the track, hand luggage and all. We learned that the nearest station was three and a half miles. There was nothing for us to do but try to walk it and carry our luggage. Many people through sheer inability to carry their grips were obliged to abandon them beside the track and work their way as best they could toward the station. I saw one poor little woman with a baby six months old, a parcel and a grip. She



British Troops Crossing London Bridge.

would carry the baby a few yards ahead and sit it down on the ground and walk back for her parcel and grip and carry them on ahead a few yards more, and come back for the baby. And the worst of it was that no one could help her because all were handicapped nearly as badly as she."

In a day or two after we reached London the influx of Americans made dear old "Lunnon Town" look like an American city. To walk along the Strand where were situated the Hotel Cecil and the Savoy which were made the American headquarters one could imagine ones-self on Broadway, New York, or State Street,

Chicago. It got so I could understand what people said as they walked along the street. And for the most part it was a grateful and even a cheerful crowd, though none of us quite knew how we were to get back to America. The steamship companies had been taxed to their capacity for return passage even before we left Chicago. All the German and English liners had been booked to their limit. In the twinkling of an eye these immense ships had been taken out of passenger service and impressed into military service, which threw all their passengers out of accommodations. Literally by the thousands tourists were pouring into London and taxing the capacity of the hotels without any prospect of getting out. The situation became hourly more acute. One American went to a steamship office and offered \$1,500 for passage to New York. The steamship company were as helpless as he. Another man who had been touring England in his Pierce-Arrow automobile offered his car for passage back. He did not stop to think that the steamship company would have made a poor investment by taking his car, because the moment it became their property the government would press it into service for military purposes.

Some idea of the situation may be gleaned from the following article which is taken from the *London Standard* of August 3rd:

STRANDED IN LONDON.
DESPERATE FLIGHT OF MANY AMERICAN VISITORS.

The sudden withdrawal from service of German liners on both sides of the Atlantic has so demoralized shipping circles that several thousand American tourists are practically stranded in London. The announcement fell like a bombshell upon the Americans, and the lamentations of those who had been booked to sail for home on the *Imperator* spread panic among the others, and thousands joined in a frantic scramble for accommodation at the offices of the other steamship lines. When it was learned that early passages could be provided for only about one-third of the besiegers the consternation was beyond description. Fears of a prolonged exile, with soaring prices together with rapidly diminishing funds and no chance to get more from home, were expressed on all sides.

These fears were given fresh force by the arrival from the Continent of many hundreds of anxious refugee tourists on Saturday and yesterday, and to make matters worse most of the West-end hotels posted notices on Saturday that no more guests would be taken in who were not prepared to pay their bills in gold. In nine-tenths of the cases this was out of the question. With few exceptions Americans travel with letters of credit or travellers' cheques issued by the various express companies of the United States, and the utmost difficulty is being experienced at present in getting these cashed. Even at the

banks and depositories upon which these are drawn there is great reluctance to give gold in exchange. Where possible, these cheques are paid in silver or in Bank of England notes, but at a number of hotels not more than one five pound note will be accepted in settlement of a guest's bill, and no gold will be given in change. As a consequence many a wealthy American finds himself in a hopeless quandary in London today, though his pockets are full of money, while even well-known millionaires are unable to raise the much-needed gold coin on their personal cheques.

EMBASSY BESIEGED.

In their distress hundreds of stranded travellers flocked to the American Embassy all day on Saturday with frantic appeals for relief in some form or other. The rush was so great that it was found necessary to keep both the Embassy and the Consulate open yesterday in the effort to allay the apprehensions of the anxious. So far, however, in the absence of instructions from the United States Government, no definite steps have been taken beyond quieting the fears of the refugees with promises of future aid and some practical assistance in a few cases of the really needy.

Instructions from Washington are expected today, and in the meantime the Embassy staff is organizing a plan of action. Passage will be secured for as many as possible on the out-going ships of British and American lines.

Mr. Thomas Nelson Page, the American Ambassador to Italy, was one of those whose plans were upset by the withdrawal of the Imperator. After something of a scramble he managed to secure a berth on the Mauretania, but an hour before sailing he received cable instructions from Washington to return at once to Italy. The leave of absence previously granted to Ambassador Page was cancelled, and that to Mr. Herrick, the American Ambassador to France, was also cancelled at the same time.

SHIPPING PARALYSIS. STOPPAGE OF MANY IMPORTANT LINERS.

One of the most disastrous effects of the war is a general paralysis of shipping in the Continental ports, and the stoppage of the services between this country and Germany. The steamer service between New York and the Continent has been discontinued by the Cunard, White Star, Red Star, America, Leyland, Dominion and Atlantic Transport lines. The sailings to England, however, are not yet interrupted.

German shipping is the chief sufferer. According to Reuter, the Hamburg-America Company have stopped the sailing of their liner Imperator from Cuxhaven for New York, and have suspended seven ships of the West Indian and Panama service. All German vessels in foreign ports have received orders to proceed to the nearest neutral ports. The German-Australian Steamship line of Hamburg has ordered its agent at Batavia to detain all the line's steamers. German vessels at Port Said have been stopped. The Cronstadt has received a cable at Brisbane prohibiting her departure.

Significant orders, says the Central News, have been sent by wireless to the steamers of the Norddeutscher Lloyd line. The Grosser Kurfurst, which sailed from New York on Thursday; the Friedrich der Grosse, which sailed from Baltimore on Wednesday; and the Neckar, which left Galveston on Wednesday, have been recalled, and the Willehad, which is now at Montreal, has been ordered to proceed to Boston.

The German East Africa liner Prinzregent, outward bound from

Hamburg, called at Southampton on Saturday, but in obedience to a wireless message not to remain in British waters she left again immediately without waiting to embark her passengers or mails.

SERVICES STOPPED.

The Great Central Railway Company have abandoned sailings from Grimsby to Hamburg, Antwerp and Rotterdam, and the various ships' crews were all paid off on Saturday. An effort is being made to recall the steamer *City of Bradford*, which left Grimsby early on Saturday for Hamburg. She is not provided with wireless, but it is hoped to communicate with some ship so provided and thus turn the *City of Bradford* back. It is also reported at Grimsby that the Great Central steamer *Dewsbury*, at present at Hamburg, is detained there owing to the River Elbe being mined. Hull sailings have entirely ceased, and Ostend packets are being diverted to Folkestone.

The South-eastern and Chatham Railway Company announce that from today all train services from Calais are cancelled, with the exception of the train to Paris running in connection with the eleven o'clock morning train from Victoria. The London, Brighton and South Coast Railway Company also announce that in consequence of the French military authorities having taken possession of the French State Railways from six o'clock last evening the company cannot guarantee to book passengers beyond Dieppe. The boat service will be maintained, and travellers are warned that beyond Dieppe they must continue their journey by motor car or some other means. On each of the company's two boats from Dieppe on Saturday there were eight hundred passengers.

Portsmouth Harbor is in the hands of the Government, and the London and South-Western Railway cannot convey passengers and goods to stations in the Isle of Wight by steamers from that harbor. There is no boat traffic by this railway company beyond Yarmouth (Isle of Wight).

The P. and O. Company announce that the cruise of the *Mantua* to the northern capitals on the 7th instant, and the cruise of the same ship to Constantinople on September 5, are cancelled.

The South-Eastern and Chatham Railway Company announce the receipt of a Flushing telegram stating that carriages of the boat trains are only being run up to the Dutch frontier.

Passengers for Australia by the Orient line will find it impossible to cross the Continent, and they are advised not to go south, but to get into touch with the head office at Fenchurch avenue, London.

All arrangements have been made to divert the services from this country to India, Australia and China now running via the Suez Canal. In the majority of cases the outbreak of war between Russia and Austria was the signal for the service to proceed via the Cape. One of the chief considerations is the premium for insuring against war risk. On Friday the premium to cover vessels proceeding through the Suez Canal was as high as 60s. per cent capture risk only, whilst vessels proceeding via the Cape direct to this country could be insured at 12s. 6d. per cent. for the same risk.

It will thus be seen that something was going on in "Merrie old England." But one of the worst features of the situation was the difficulty about money. It began when we were in Paris and grew more and more acute. We heard stories of people going hungry with plenty of money in their possession.

simply because they chanced to have letters of credit, traveler's checks, or bills of large denomination which the hotels and restaurants would not accept. One man from Canada walked the streets of Paris with a fifty franc bill in his pocket all day unable to buy a bite to eat because no one would change it for him, and the restaurants would not accept it. He finally went to one of the post office stations, purchased a money order, and immediately went to another to get it cashed. Even then he came nearly getting left owing to the fact that the second station declined to give him the denomination he wanted, but after the most earnest solicitation on his part he got enough to tide him over.

Personally I was more fortunate. I carried American Express checks, and I wish to give my experience with them. I shall surely never travel again without them, because the American Express Company has an office in nearly every city. But I was informed in Paris that I would have difficulty in getting my checks cashed, on account of war conditions, and the fact that there was such a run on the Express Company. I did not lose any sleep over the matter, because I had always had such good success with these checks, and felt that somehow I could turn them into money. So I went to the American Express Company in Paris, and found it besieged. There were a lot of clamorous people on one side of the counter, and some careworn and over-wrought clerks on the other side. I picked out a clerk at the far end of the room, and my first greeting was: "Well, you are having a pretty tough time of it, aren't you?" He looked up in surprise. That was not the kind of salute he was accustomed to these days, and he showed a softening of expression. "A trifle, sir; what can I do for you?" "Well," said I, "it would be a great accommodation if I could get a little money on some American Express checks. I am in Paris with my wife and daughters and no available funds except these, and I have always had such comfort traveling with the checks that it is a new experience to be worried about money matters when I have them. I am sorry to be obliged to trouble you when you are so busy, but I seem to have no alternative."

He peered at me through the window as if he expected to see some rare kind of animal, or an individual evidently gone daft from excitement; but I must at least have had on my coun-

tenance an expression of almost human intelligence, because he remarked: "All right, sir; I think we can help you out. How much do you want?" Now here was the rub. I had heard that they were paying out only limited amounts in their own protection—in some cases not more than twenty dollars—but I knew it would require at least two hundred dollars to pay my hotel bill and put me safe through to London, and I told him so. I really expected him to balk, the request seemed so unreasonable under the circumstances, but he merely said: "Very well, but I may have to ask you to accept most of it in rather large denominations." "All right," said I. "Whatever is most convenient to you. I am sufficiently thankful to get it at all, and I can assure you that I am very appreciative of the courtesy you have shown me." He peered through the window again, wheeled on his heel, and began fumbling in a drawer. "I'll do better than that for you," he remarked, and counted me out two hundred dollars that I could use anywhere in Paris.

I recite this circumstance in detail for two reasons—one to prove that it always pays to show some consideration for men who are placed in difficult situations and who are laboring under severe stress, and the other to recommend the American Express checks for travelers. I have always found the utmost courtesy on the part of the company's employees, and I have invariably been able to cash these checks when I could cash anything.

C. N. J.

(To be continued.)

BOOK REVIEWS.

A LABORATORY MANUAL AND TEXT-BOOK OF EMBRYOLOGY. By Charles W. Prentiss, A. M., Ph. D., Professor of Microscopic Anatomy in the Northwestern University Medical School, Chicago. Octavo of 400 pages with 368 illustrations, many of them in colors. Philadelphia and London: W. B. Saunders Company, 1915. Cloth, \$3.75.

This is a quite pretentious volume superbly illustrated and exceedingly well written. Many of the illustrations are in colors, and the whole work constitutes a very satisfactory text-book on the subject. While it is mostly intended for the medical student,

yet the dental student will find much of value in it. There is a section on "The development of the teeth," which though brief is well worth study. We are glad to recommend this book for those who are interested in the subject.

DISSECTION METHODS AND GUIDE. By David G. Metheny, M. D., L. R. C. P., L. R. C. S. (Edin.), L. F. P. S. (Glas.) Associate in Anatomy and for some time senior demonstrator in the Daniel Baugh Institute, the department of Anatomy and Biology, Jefferson Medical College, Philadelphia. Octavo volume of 131 pages, illustrated. Philadelphia and London: W. B. Saunders Company, 1914. Cloth, \$1.25 *net*.

This book takes nothing for granted in the minutiae with which each dissection is described and it will therefore be an accurate guide for the student to follow. It is well that such a book is issued, because to properly learn anatomy it is necessary to dissect, and in order to dissect well and intelligently, it is necessary to do it systematically and thoroughly. Relative to acquiring a knowledge of anatomy the author truly says in his preface: "Anatomy that has merely been memorized can only be of service in passing examinations. Such anatomy is speedily forgotten, and can never be of any real value." And he might have added that dissections which merely cut up the subject without system or significance are almost as bad as no dissections, so far as any value to the student is concerned. This book will be of benefit in directing the student along the proper lines in his early experiences in the dissecting-room.

A TEXT-BOOK OF DENTAL PATHOLOGY AND THERAPEUTICS. Based on the Original of Henry H. Burchard, M. D., D. D. S. Rewritten by Otto E. Inglis, D. D. S., Professor of Dental Pathology and Therapeutics in the Philadelphia Dental College. Fifth Edition, thoroughly revised. Octavo, 807 pages, with 708 Engravings and one Colored Plate. Cloth, \$5.00, *net*. Lea & Febiger, Philadelphia and New York, 1915.

For a text-book on this subject to run into five editions speaks eloquently in two important particulars—the growing interest in Dental Pathology and Therapeutics, and the excellence of the work itself. The untimely death of Burchard would have been an irreparable loss to the profession had not Inglis stepped into the

breach and assumed the task of keeping the work revised and up to date. That this has been well done is attested by the character of the present volume. It is filled with useful knowledge from beginning to end, and brought down to the latest minute, even to a mention of the emetin treatment for pyorrhea alveolaris. The study of pathology is being emphasized more and more in our better colleges, and not without a good reason. In times past the average curriculum was seriously deficient in this important study, and the graduate went out with a very vague idea, if indeed he had any idea at all, of pathological manifestations in the mouth. Now this is being changed, and it may safely be said that the volume under consideration has been no mean factor in bringing this about. The press work and illustrations are beyond criticism, as is customary with these publishers.

PRINCIPLES AND TECHNIQUE OF CROWNS AND BRIDGES. By J. F. Hovestadt, D. M. D., Instructor in Crown and Bridge Work, Harvard Dental School. 231 pages. Published by Ritter & Flebbe, Boston, Mass.

The author is evidently a painstaking crown and bridge worker, and he describes his methods in this work, illustrating the various cases and describing the technique. Some of his restorations will prove interesting to men doing this kind of work, and the various steps are made so simple that a student should be able to follow them. For succeeding editions we would suggest that greater care should be given to the nomenclature of the subject. For instance, the term "six-year molar" should no longer be admitted to our literature, while to describe a "M. O. D." cavity as a "mesial-occlusal distal" is scarcely in keeping with modern usage. Let us suggest that "mesio-occluso-distal" is the correct term. Lapses of this character occur more frequently than they should in a book intended for students, and we are sure that the author will wish to relieve his work of these discrepancies in another edition. The paper and press work reflect great credit on the publishers.

PRACTICAL HINTS.

Edited by J. E. Schaefer, D. D. S.

(This department is for busy readers. We want short articles containing practical hints—the shorter the better. No article must exceed 200 words, unless of exceptional merit. Every dentist has some useful hint that has been of value to him, and if he will only put it in print it may be of equal value to others. That is what this department is for. Due credit will be given for every article sent. Address J. E. Schaefer, 1745 W. Harrison St., Chicago, Ill.)

Mixing Amalgam:—Place proportions in mortar; mix for a few minutes and transfer to palm of your hand, then mix and work it with middle finger, squeezing out excess of mercury.—*H. H. Pfister, D. D. S., Wahpeton, N. D.*

Restoring Cuspid Eminence:—To restore the lost features by the extraction of the cuspid teeth, the plate can and should be worn higher over the cuspid eminence but dropping suddenly back of it to give free play for the muscle. The gum should be two to three times thicker than over the incisors.—*L. P. Haskell, Chicago.*

Hypodermic Needles:—To lengthen the life of hypodermic needles which often become clogged and useless, take a fine barbed broach and pass through lumen of needle several times. This will thoroughly remove any debris. Then pass alcohol through, insert in a piece of cork and your needle is ready for use and good as new.—*D. C. Neymark, D. D. S., Chicago, Ill.*

Constricted Pulp Canals:—When a constriction in a pulp canal is met with in an upper bicuspid the mouth lamp can be placed on the lingual or buccal and the canal illuminated. The continuation of the canal is seen as a small black spot. Place a fine drill in engine on this spot and a few revolutions of the engine will cause it to jump through into the canal beyond the constriction.—*E. S. Best, D. D. S., Minneapolis.*

Hemorrhage in Adult Female Patient:—When a tooth is extracted from a female, a temporary copious hemorrhage is often met with which seems to occur during dysmenorrhea. In these cases the wasting blood has a tendency to find its outlet anywhere, such as

in the mucous membrane of mouth or nose. It has happened, many times, in cases which I have operated on. It is pathologic, but should not be alarming.—*A. M. Matsuno, D. D. S., Sacramento, Cal.*

Restoring Faulty Margins on Inlays:—1. Cut box cavity in inlay involving faulty margin.

2. Take a rope of gold foil just large enough to fill cavity.

3. Place inlay in position in the mouth and burnish gold foil over the margin of the tooth.

4. Remove inlay from the mouth and solder with 22k. solder. The foil absorbs the solder and becomes united to the inlay.

—*J. H. Kaplan, D. D. S., Chicago.*

The Saliva Ejector:—Times were when the saliva ejector was used only during short stages of our work, and thus the patient was free for conversation, and tactics of delay for a good portion of the sitting. But times have changed. "Talk is cheap" is no more applicable here than when one calls up "long distance," therefore every effort must be made to cut out the conversation line. Talking and the constant rinsing of the mouth by the patient, formerly the greatest of needless time consumers have for some time been, if not entirely cut out, at least reduced to a minimum, by the constant use of the saliva ejector.—*C. E. Kells, D. D. S., New Orleans.*

Obtunding Sensitive Dentin in Gingival Cavities of Anterior Teeth:—It is a very simple matter to obtund sensitive dentin in the class of cavities named with the use of Ethyl Chlorid. It is essential to have every thing at hand, clean sharp burs and the dental engine in place so there will be no delay in changing burs. Use cotton rolls to keep tooth and gums dry. Place dental napkin (folded), over tooth and spray on this for about ten seconds, this will take up the first shock, then remove napkin and direct vaporized stream on tooth to be anesthetized and well up on the gums. Hold glass tip about one and one-half inches from tooth. Do not let liquid accumulate on the surface, but use just enough so it will evaporate as soon as it strikes. After spraying a few seconds the gums will turn white and anesthesia is complete and you can prepare cavity without pain. I use Gebauer's Ethyl Chlorid

tube which has a valve with screw head that controls spray to a nicety.—*John C. Hamill, D.D.S., Sandwich, Ill.*

Seamless Shell Crowns:—The tooth is prepared in the usual manner and a copper band fitted and contoured. A small quantity of some carving compound (metalline serves very well) that will not distort under the heat of molten fusible alloy, is warmed to render it plastic and placed on the occlusal portion of the band and the patient instructed to "bite." Now carve the compound so that it, together with the copper band, forms a pattern. Remove pattern from the tooth, fill with molding composition, and set it on another bit of molding composition so shaped that the band will just touch it at all points. If this is placed on a piece of cardboard it facilitates handling. A ring commonly known as a "split mold ring" or "dividing mold cup" is placed over the pattern and fusible alloy poured into it. The mold is then knocked out of the ring, split, and the pattern removed. A seamless shell that will approximately fit is placed in the mold and the mold replaced in the ring. It is now filled with some swaging material, covered with a small piece of rubber dam to prevent forcing the material from the swager into the mold around the shell, and swaged. Mark the gingival line on the shell as indicated by the mold, remove, trim, reinforce and polish. By this method the entire crown is made as quickly as the cusp alone can be made for a soldered crown.—*Albert Bunch, D.D.S., Chicago.*

Compressing Porcelain:—In making inlays the porcelain is pressed into the matrix in a swaging press, under absorbent pads, and carved to best control shrinkage. Contrary to the usual practice, the porcelain is worked toward the periphery leaving the center or body until last, this gives perfectly solid margins with good color up into the feather edges with unusual edge-strength.

Using a creamy plastic mix of a gritless snow-white cement, that is calcined to 3600 degrees, it is possible to force the inlay home, cutting off the cement at margins completely which facilitates shading, as the absence of any pigment in the cement keeps up the life and true color of the porcelain.

In the case of angle-restorations and jacket crowns, the porcelain is ironed or burnished on, then beat until most all the moisture

has disappeared, and the surfaces smooth, so that the fused mass will be perfectly smooth, free from cracks and bubbles.

To get real porcelain, one must learn to bake. Uniform baking is essential to good results. Ascertain the speed of your muffle, run to a given point in a certain length of time, every time—too fast will cause blisters, too slow roasts the flux, and too slow to the given point will be an over-fuse, compared to the faster run to the same point.—*W. G. Hine, D. D.S., Chicago.*

“Prophylactic Bridgework”:—The patient who presents conditions indicating bridgework either shows a lack of knowledge regarding oral hygiene and prophylaxis or else will declare a willingness to be taught how to protect his dental work in the future.

This then, must be borne in mind when placing bridgework for this patient, furthermore it should be so constructed that he can readily and intelligently follow your instructions regarding the care of the case in question.

Contact points must be normal, and are essential where the bridge adjoins neighboring teeth.

The interproximal spaces must be left open to allow the patient to pass dental floss through these places for purposes of daily cleansing.

Instead of scraping model as is usually the custom adapt a very thin layer of technique wax on the impression of the ridge between abutments, then after running up the model this thickness of wax removed from the model will allow for sufficient impingement of swing-in or saddle upon the membrane on the ridge, obviating the necessity of indifferent scraping. The finished piece will rest uniformly on the tissue overcoming the irritation that usually occurs under saddles otherwise constructed.—*E. A. Schmuck, D. D. S., Chicago, Ill.*

MEMORANDA.

[Society notices will be given insertion in this department free of charge. Subsequent insertions will be charged for at the rate of \$2.00 an inch.]

TENNESSEE STATE DENTAL ASSOCIATION.

The 48th annual meeting will be held at Sewanee, June 24, 25, 26, 1915. C. O. Rhea, Secretary, Nashville, Tenn.

THE AMERICAN DENTAL SOCIETY OF EUROPE.

List of officers: President, Dr. William A. Spring, Dresden; Vice-President, Dr. F. E. Perry; Secretary, Dr. H. G. Fisher, Cologne; Treasurer, Dr. O. Solbrig; Microscopist, Dr. C. F. Bödecker; Editor, Dr. H. W. C. Bödecker.

KENTUCKY STATE DENTAL ASSOCIATION.

This Association will hold its forty-sixth annual meeting at Ashland, June 8, 9, 10, 1915. The program will be carried out on the Progressive Clinic order. All reputable dentists are invited to attend. Chas. R. Shacklette, Secretary, 540 The Atherton, Louisville, Ky.

MICHIGAN STATE BOARD OF DENTAL EXAMINERS.

The next regular meeting of the Michigan State Board of Dental Examiners, for the examination of applicants who wish to practice dentistry in Michigan, will be held in the Dental College at Ann Arbor, beginning Monday, June 14, 1915, at 8:00 A. M., and continue through Saturday, June 19. For application blanks and full information apply to A. W. Haidle, Secretary, Negaunee, Michigan.

AMERICAN INSTITUTE OF DENTAL TEACHERS.

At the last annual meeting of the American Institute of Dental Teachers held at Ann Arbor, Michigan, the following officers were elected for the ensuing year: President, H. M. Semans, Columbus, Ohio; Vice-President, S. W. Bowles, Washington, D. C.; Secretary-Treasurer, J. F. Biddle, 517 Arch Street, N. S. Pittsburgh, Pa. Executive Board, A. W. Thornton, Montreal, Canada, R. W. Bunting, Ann Arbor, Michigan, A. D. Black, Chicago, Ill. The next annual meeting will be held at Minneapolis, Minnesota, January 25th, 26th, and 27th, 1916.

WISCONSIN STATE BOARD OF DENTAL EXAMINERS.

The Wisconsin State Board of Dental Examiners will convene in Milwaukee at Marquette University on June 21, 1915, at 2 P. M., for examination of applicants to practice in Wisconsin.

High school diploma, application and \$25.00 fee to be filed with the secretary ten days prior to above date.

Dental diploma to be presented in advance of the examination.

Junior dental students presenting a clear card for two years' uncon-

ditional work from a reputable dental college and filing a high school diploma, or its full equivalent, will be permitted to participate in the theory examination in the following six major subjects: Anatomy, Physiology, Histology, Chemistry, Bacteriology, Materia Medica. Satisfactory grades made in these subjects will be credited at subsequent examinations.

Special application blanks for this examination and \$10.00 fee, together with high school credits, to be filed ten days in advance. S. H. Chase, President, W. T. Hardy, Secretary, 1404 Majestic Bldg., Milwaukee, Wis.

RESOLUTIONS PASSED BY THE MINNESOTA STATE DENTAL ASSOCIATION.

WHEREAS it has pleased Almighty God in His wise providence to remove from our midst and from this earth our beloved and highly esteemed brother, Dr. C. H. Robinson, who died January twenty-third, 1915, and

WHEREAS by his death the commonwealth has lost a citizen of the highest type and the profession an eminent and highly respected member, who, throughout his career was ever among the foremost working for the advancement of his fellowmen, and

WHEREAS by his death the Minnesota State Dental Association has sustained an irreparable loss, therefore be it

RESOLVED that we, the Minnesota State Dental Association, feeling that we have sustained a great loss, hereby express our sorrow caused by the sudden culmination of this brother's noble career, and be it further

RESOLVED that a copy of these resolutions be spread upon the minutes of this association and a copy be sent to the bereaved family and to the Journal for publication.

J. W. GALLAGHER,
W. D. JAMES,
R. W. BERTHEL.

DR. J. N. CROUSE.

At the annual meeting of the Dental Protective Association held in December, 1914, being the first meeting subsequent to the death of Dr. Crouse, a committee was appointed to prepare for publication a statement which might serve to show the appreciation of the members of the Association for the character and great services to the dental profession of Dr. J. N. Crouse, who organized the Association and was its president and executive head until shortly before his death.

Dr. Crouse displayed great ability and tremendous force of character, and enthusiasm and perseverance which finally overcame the general indifference, and much active opposition of the dental profession, and won a sufficiently numerous membership in the Protective Association to provide enough funds to resist successfully the claims of the Crown and Bridge Company. The defence was so complete that the Crown and Bridge Company never collected anything of consequence from the dental profession. If the dentists had been obliged, for a year or two at first, to pay the licences demanded by the Crown Company, as they had previously done for many years to the Goodyear Dental Vulcanite Company, the great services rendered by Dr. Crouse through the Dental Protective Association would have been universally acknowledged. At is was, appreciation for his services was less in evidence than a persistent and essentially unfair complaint and criticism of Dr. Crouse personally, and of his management of the affairs of the Protective Association. It did not seem to be understood that a plan of organization similar to that of our dental societies is not well adapted to fight a legal battle. It was indispensable, as in war, that one man should be in supreme command, able to choose his own helpers

and subordinates, and to command the entire resources of the association for instant action whenever necessary. So far as appears, there was no other man in the dental profession who had the ability, and the willingness to make the personal sacrifices necessary to accomplish what he did. The value of his services to the profession can never be known; that it amounted to millions of dollars there is no room to doubt.

Dr. Crouse always took an active interest in the welfare and progress of his profession and for many years he was a familiar figure to all who attended dental society meetings anywhere. He came to Chicago from Mount Carroll, where he was then practicing, to become one of the charter members of the Illinois State Dental Society, and for some time before his death he was the only surviving charter member who had maintained his membership continuously. He was active in the administrative affairs of the three principal societies to which he belonged; the Chicago Dental Society, the Illinois State Dental Society, and the American Dental Association, (which was merged into the present National Dental Association.) He was president of each of them, and was for many years a member of the executive committee of the American Dental Association.

The last important service to the Dental Protective Association was the arrangement with Dr. Taggart by which the members of the Association received licences under his patents for a trifling sum. (Less than a dollar a year for the terms of the patents.) In this he had the active assistance of the other directors, Dr. C. N. Johnson and Dr. J. P. Buckley, and without all three of them the plan probably would have failed.

Dr. Crouse did not receive in his lifetime the honor and appreciation from his profession that his great services deserved and which undoubtedly will be accorded to him in the future. He will have a place among the great benefactors of the dental profession.

J. E. HINKINS,
C. E. BENTLEY,
EDMUND NOYES, (Chairman).

Statement of the ownership, management, circulation, etc., required by the Act of August 24, 1912, of THE DENTAL REVIEW, published monthly at Chicago, Ill., for April, 1915.

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FRED W. MOWBRAY, Business Manager.

Sworn to and subscribed before me this 15th day of March, 1915.

(SEAL)

JANE ETHEL WHITMAN, Notary Public.

(My commission expires February 6, 1917.)

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No. 5

THE EVOLUTION OF DENTISTRY.*

BY EDWARD C. KIRK, D. D. S., SC. D., LL. D., DEAN OF THE SCHOOL OF
DENTISTRY, UNIVERSITY OF PENNSYLVANIA.

We are met here to-day to signalize a new epoch in the educational development of a specialized field of the science and art of healing which, as an organized professional activity, has just completed the seventy-fifth year of its existence. The growth of dentistry considered from the viewpoint of its formative forces runs parallel in all essential features with the evolution of the healing art in general. There is every reason to believe that among the physical ailments which from the earliest times have impelled mankind to seek relief at the hands of the healer, the distresses arising from defective teeth have demanded attention. The treatment of dental diseases may, therefore, be regarded as coeval with the first efforts of primitive man to find relief from his other bodily infirmities. Evidences of the existence of a large body of knowledge concerning clearly recognized dental disorders with suggestions for their treatment have been traced back to a period as early as the first Egyptian dynasty, about thirty-seven centuries before the Christian era. It is highly probable that in that remote period the treatment of diseases of the teeth was carried on by the healer or physician of the time as a part of his general practice, but Herodotus, who wrote about 450 B. C., states that at his time there were in Egypt a number of physicians who, instead of practicing general medicine, devoted themselves to specialties, some treating diseases of the eye, others diseases of the teeth, others diseases of the head,

*Address presented at the Dedicatory Exercises of the Thomas W. Evans Museum and Dental Institute, School of Dentistry, University of Pennsylvania.

abdomen, etc., from which statement it appears that in the fifth century before Christ, dentistry was practiced in Egypt as a distinct specialty. Dentistry as a specialty was practiced at a remote period by the Etruscans, who carried the art to Rome. The practice of dentistry was so general in the fifth century B. C., that the ancient Roman law of the Twelve Tables contains a provision forbidding the burial of any gold with the body of a deceased person other than that which is used to bind the teeth together. If the statement of Pliny may be relied upon, the Romans had no physicians for several centuries and that the first to practice there was one Archagathus, a priest, who came to Rome in the sixth century after the founding of the city, an epoch some centuries after the promulgation of the law of The Twelve Tables. Pliny's statement might suggest that the need for the physician did not arise among the Romans until after their teeth had become defective, a suggestion, the soundness of which, modern investigation is tending to more and more establish.

The high state of development of dental art in Rome about the beginning of the Christian era is clearly indicated by a number of writers of the time, among others, Horace, who in one of his satires depicts two courtesans, Sagana and Canidia, the former as wearing a wig, and the latter false teeth; also Martial, in a number of his epigrams, makes allusion to artificial teeth, thus in one of his poems he speaks of a certain courtesan as having teeth of bone and ivory; in another epigram, he praises the beauty of Lecania's teeth, "white as the snow," but further on he remarks that "they are not her own." And to another he says, "Your teeth, as your gown, you nightly remove." That these allusions to early dental art by the writers quoted are wholly justified has been comparatively recently demonstrated by the discovery in ancient Etruscan tombs of actual specimens of the dental art of the period.

I have drawn attention to these early historic records in order to emphasize the fact that the art of dentistry is very ancient, insofar as it had to do with the mechanical restoration of lost teeth by artificial substitutes, and other forms of mechanical treatment of defective dentures. In this early epoch these restorative mechanical operations upon the teeth were performed

by artisans or mechanics having no connection whatever with medicine or surgery. In the course of time, it is highly probable that these operators upon the teeth were called upon to perform minor surgical operations and to treat certain diseases of the teeth; indeed, Martial, in one of his epigrams, mentions one of these ancient specialists by name; he says: "Castellius pulls and treats diseased teeth." On the other hand, diseases of the teeth themselves and the parts associated with the teeth have received the attention of physicians from the earliest time. According to tradition, Esculapius, who flourished some thirteen centuries before the Christian era, invented a number of curative measures for diseases of the teeth and tradition accords to him the invention of the forceps for the extraction of teeth. Hippocrates, who wrote about 400 B. C. records in his work many observations relating to diseases of the gums and their treatment, but none of the early medical writers makes any reference to constructive dental art, which, until comparatively recent times, appears to have been a distinct specialty practiced only by those who were mechanics or artisans having possibly a very superficial acquaintance with the simpler disease conditions which affected the teeth upon which they operated. Their art was addressed simply to the restoration of defective conditions in the masticating mechanism by mechanical means.

It will thus be seen that dentistry has had a dual origin. Its problems in pathology have kept it in constant and vital relation with medicine, while its requirements in the restorative phase of its art have necessitated its relations with the craft of the artisan, and it is this latter feature so essential to its practice that has, in the course of its evolution, developed dentistry as a distinct profession, having a separate system of preparatory education, a special literature and a professional organization independent of medicine.

Throughout the long period of ignorance and superstition preceding the organization of the dental profession upon an independent educational basis humanity was dependent for relief from its dental ills upon two types of practitioners; first, those who were medical men without knowledge or skill in the handicraft necessary to the successful performance of constructive restorative operations upon the teeth, and second, those who were artisans

or mechanics more or less skilled in the filling and mechanical treatment of the teeth and in the construction of artificial dental substitutes. This, in general, was the status of affairs in dentistry up to the fifth decade of the nineteenth century. What we are accustomed to refer to with some pride as "American dentistry" is an importation of European dentistry, so far as its origins are concerned. Soon after the American colonies began to grow in strength and proportions sufficient to offer an attractive field for dental practice, a number of peripatetic dental practitioners from Europe with a view to bettering their fortunes visited the colonies. In 1780 there came to America Joseph Lemaire, a French dentist, and James Gardette, also a French dentist, holding a surgeon's commission in the French Navy. Both of these men are attached to the French Auxiliary forces under Count Rochambeau, and when the French forces were in winter quarters at Newport, during the last winter of the Revolutionary War, Lemaire and Gardette instructed in their art Josiah Flagg, a young officer in the Colonial Army who, after the close of the Revolution, opened an office for the practice of Dentistry in Boston. Thus it was that the dental art of France which, at that time, had reached a comparatively high degree of development, was transplanted to America, and Josiah Flagg, the pupil of the French dentist Lemaire, has justly come to be regarded as the first dentist who received his education upon American soil. Both Lemaire and Gardette practiced for some time in Philadelphia, Gardette remaining in practice here until 1829, when he returned to France.

While the beginnings of dentistry in America were transplantations from both England and France, it is to the latter country that we are primarily indebted for the impulse which has created that distinctive system of practice based upon a specialized educational plan which later developed into the dental profession of modern times.

A distinguishing feature of dentistry during the first quarter of the nineteenth century was the commercial character of its ideal. Its proudest achievement was the ingenuity and manipulative skill of its craftsmanship both in the laboratory and the operating

The practice of dental art was upon a purely em-

pirical basis, no means for systematic dental education existed, there was no dental literature worthy the name and no professional organization. Practitioners of the art jealously guarded their modes of procedure as trade secrets are guarded at the present time. Professional intercourse in a general sense was not possible owing to the jealousy which existed among practitioners, and because of the prevalent spirit of commercialism and the ignorance of the general public concerning dental matters, much charlatanism and quackery prevailed. That a spirit of commercialism should dominate dental practice in its earlier days was inevitable from the very nature of its service. The dental craftsman sold the product of his handiwork to the patient for a price. The character of the material employed and the amount of labor involved in the construction of the artificial restoration were the determining factors as to size of the fee which the operator charged, and, so long as the remuneration of the operator was determined by the value of the material supplied and the amount of labor expended by him in its construction, and so long as the dentist was influenced by a consideration of these material values, he was necessarily dominated by a commercial ideal. It was precisely this atmosphere of commercialism prevalent among the earlier dentists that gave to their calling the characteristics of a manufacturing business, and subordinated, if it did not to a large degree obliterate the professional ideal. It was into such an atmosphere in 1839 that Horace H. Hayden and Chapin A. Harris, two men whose benefaction to dentistry easily entitled them to the highest place of honor in the Vallhalla of our immortals, came as the propagandists of a new gospel of professionalism in dentistry, which broke the shackles of commercialism and infused the spirit of professionalism into dental practice that is to-day bearing abundant fruit, and has given to dentistry an established place among the recognized professional callings.

By their united activities, they established in 1839 the Baltimore College of Dental Surgery, the first dental college in the world, the American Journal of Dental Science, the first dental periodical in the world, and the American Association of Dental Surgeons, the first national association of dentists in the world.

The College of Hayden and Harris, the mother of dental colleges, still an active and important factor in dental education, was successful from the start and so manifestly did it reflect an existing need, that similar institutions were founded from time to time until, at the present, there are upwards of sixty dental educational institutions in the United States, each offering a curriculum of study which, in principle, is that devised by Hayden & Harris in 1839. The founders of the first dental college had seen with prophetic vision that in the future development of medical science and art, the mere increase in bulk of medical knowledge must ultimately divide the teaching and practice of medicine into separate specialties. Failing in their efforts to induce the authorities of the University of Maryland to provide facilities for the education of dentists and confident of the reality of the need for dental educational facilities, they were compelled to accept the only alternative and establish dental education upon an independent and autonomous basis. Doubt has been frequently expressed as to the wisdom of this course, nevertheless, the growth of dentistry during the seventy-five years of its professional existence has furnished a sufficient justification of the wisdom of the pioneers who founded the first independent dental school. On the other hand, the growth of medical science in general and the essential part which medical science played in the dental curriculum made it necessary to include among the studies that must be pursued by the prospective dental practitioner practically all of those subjects of the medical curriculum which are fundamental to the whole science and art of healing. It has come to be necessary for the properly equipped dental practitioner to be well grounded in a knowledge of the structure, the composition, and the functions of the human body both in health and disease and to have an adequate knowledge of the means of therapeutic treatment of all of those diseases of the mouth and the associated parts which come within his province to treat. Moreover, the properly trained dentist must have a practical acquaintance with the surgery of the mouth and jaws, and he must be competent to do surgical operations that come within the field of his activities with intelligence and skill.

In the evolution of both medicine and dentistry, so close have their relationships become that a considerable number of

the medical schools of the United States and elsewhere have organized departments for the training of dental students who receive their instruction in certain of the medical branches concurrently with medical students. The great importance of dental education in 1867 led to its inclusion under the fostering care of the higher seats of learning. The pioneer in this respect was Harvard University, followed by the University of Michigan in 1875, and the University of Pennsylvania in 1878. The inclusion of dental curriculum in the university plan of education is an important epoch in the history of dental professional education, in that it is an official recognition by the higher institutions of learning of the wisdom of the pioneers in dental education in establishing the dental profession upon a distinct and independent basis.

During the past twenty-five years the remarkable development which has taken place in medical science, particularly the flood of light which has been thrown upon the causation of disease by the epoch-making discoveries of Koch, Pasteur and the group of scientists who have created the science of bacteriology have brought forward problems in dental practice of the utmost importance, not only with regard to disease conditions of the mouth, but their connection with disease conditions in remote parts of the body. It is now a well-established fact that the mouth is the portal of entry for the majority of disease-producing germs that are the exciters of disease conditions in the body, and that an unclean mouth is an infected mouth which is a constant menace to the health of the individual. It is also well established that many obscure nervous disorders, cases of arrested growth, interferences with mental development, malnutrition, inflammatory lesions of the joints, valvular heart lesions, and many other bodily disorders have their heretofore unsuspected origins in the unclean or diseased mouth. It has come within the province of dentistry to study these problems and to not only undertake their treatment but by securing the maintenance of the mouth in a hygienic condition, prevent the occurrence of these disorders which have a mouth origin and are, therefore, strictly within the category of preventable diseases.

It will be readily seen from what I have said that the scope

of dental practice to-day is larger and more complex than it was seventy-five years ago when the dental profession was first organized. It is for the purpose of preparing men to meet the conditions imposed by modern dental practice in all of its aspects that the educational plan, building and equipment of The Thomas W. Evans Museum and Dental Institute School of Dentistry, University of Pennsylvania, has been provided by a co-operative affiliation between the Board of Trustees of the respective institutions. "An arrangement which will secure to the students to be educated therein more fully and adequately than would otherwise be possible the advantages Dr. Evans intended to confer upon them."

The late Dr. Thomas W. Evans, of Paris, was best known in a public sense by reason of some of the more dramatic and outstanding incidents of his public life. His friendship with the late Emperor Napoleon III, his success in amassing a large fortune, his professional relations with European rulers which gave him access to nearly every court in Europe, the assistance which he rendered the Empress Eugenie by rescuing her from the mob in the Tuilleries and enabling her to escape to England during the trying times of the Commune in 1871 are well known. These public acts of his career have served to obscure the importance of his position and character as a representative practitioner of dentistry. Of humble origin, with no greater prospect of success before him than those which apparently await any recent graduate in dentistry, he rapidly rose to a position of commanding influence as the result of his own efforts and indomitable perseverance, but notwithstanding his abundant material success, he never in all relations of life failed to acknowledge his allegiance to his profession, nor to use his efforts and influence for the elevation of its standards and to win for it that recognition from others of which he deemed it to be eminently worthy. In all that pertained to the art of dentistry he was ingenious and resourceful, and he was constantly on the alert for the discovery of useful ideas applicable to the exigencies of his practice.

The breadth and liberality of his mind in professional matters was a marked characteristic and throughout his long and active career he emphasized both by his life and his writings the

ideal of professionalism which was the governing motive in his work. He had long planned a benefaction for the profession that he loved and in order to make it effective he provided in his last will and testament for the erection, at 40th and Spruce Streets, in Philadelphia, on the lot where formerly stood the house once occupied by his parents, of a dental educational institution "to be conducted as such institutions of learning are now conducted in Philadelphia, and not inferior to any already established, fire and burglar proof and of artistic and refined beauty."

Fifteen years elapsed after the death of Dr. Evans before the benefaction of dentistry which his will provided, could be materialized. What seemed to be interminable litigation over the disposition of his several bequests threatened for a time to defeat the carrying out of the major purpose of his will. Through the self-sacrificing patriotic devotion of the Hon. John Weaver, then Chief Magistrate of Philadelphia, and the gentlemen associated with him as members of the Corporation legally chartered and empowered by the State of Pennsylvania to take over and administer the trust imposed by the will of Dr. Evans, and with the intelligent and unremitting help of Mr. Joseph W. Catherine and Mr. G. Heide Norris, the eminent legal counsel of the Corporation, a settlement of the estate was finally effected whereby the residue thereof became available for the carrying out of the benefaction of Dr. Evans to the dental profession through its educational activities. The residue of the estate representing material resources at the disposition of the Corporation being insufficient to fully and effectively carry out the wishes of Dr. Evans as expressed in his will, a co-operative affiliation was arranged with the trustees of the University of Pennsylvania whereby the resources of both institutions are made available for the end in view, an arrangement practically possible from the fact that the aims of both corporations with respect to dental education are identical.

The magnificent structure with its unequalled equipment which to-day we dedicate to the uses of dental education, is the materialization of the specific request of Dr. Evans that the institution for which he made provision should be housed in a building "fire and burglar proof and of artistic and refined beauty." In its organization ample provision has been made

for the three fundamental activities necessary to dental educational progress. First, the training of undergraduates in preparation for professional practice. Second, facilities for post-graduate instruction in the later developments of dental science and art, and third, opportunity and facilities for the prosecution of original scientific investigation in matters pertaining to dentistry. All of which is made practically accessible to any and all who are competent to take advantage thereof and profit thereby.

The science and art of dentistry has long since passed the stage of development where its ministrations consisted wholly of mechanical restorations. It has grasped and fully comprehends the ideal of the redemptive and restorative character of its work and to-day is keenly alive to the new responsibility which is confronting it as an important factor in the prevention of general bodily disease.

In the creation of this new center of dental educational activity, its faculty realizes that the weight of responsibility imposed upon them bears a direct relation to the opportunity which the benefaction of Dr. Evans has made possible, the responsibility, as he himself expressed it of "placing our profession on more commanding ground and making it better serve the generation in which we live." It is the re-dedication of the educational staff of the Institute to that ideal which must be regarded as not the least important factor in the dedication of this new building and the benefaction which it represents.

In view of the exalted purpose of him whose belief in the usefulness of his profession to humanity impelled him to make provision for this splendid benefaction; in view of the singleness of purpose with which all who have been concerned in working for its realization have sympathetically labored to a common end, and in view of the high ideals of those who constitute its teaching force, may we not confidently expect that the Thomas W. Evans Museum and Dental Institute School of Dentistry, University of Pennsylvania, shall stand forever in the City of Philadelphia as the fruitful source of training of those who shall go forth from her walls equipped to intelligently combat the ills of humanity that fall within the province of dentistry to treat and to prevent. Such being her exalted mission, then so long as we are all loyal to the ideals which she

represents the Evans Institute will be in a very real sense like that tree seen in the heavenly city of the vision of St. John the Divine:

"In the midst of the street of it and on either side of the river was there a tree of life which bare twelve manner of fruits and yielded her fruit every month; and the leaves of the tree were for the healing of the nations."

POSTERIOR RESTORATIONS.*

BY J. F. F. WALTZ, D. D. S., DECATUR, ILLINOIS.

Twenty or twenty-five years ago the gold shell crown was considered the best of good practice in making restorations of badly broken down molars and bicuspid. Frequently the operator remarked, upon the completion of such an operation, "Now, this piece of work may be counted upon to do service as long as you live," and such statements were honestly made and confidently believed. Many teeth which might have been filled were treated in this manner, although the most conscientious operators limited the use of shell crowns to molar and bicuspid teeth, never employing them upon the cuspids and incisors unless occasionally upon the cuspids when used as an abutment for a bridge. From such beginning the shell crown has gradually come to be used by a majority of operators, until today any molar or bicuspid tooth which might be restored with a compound filling is too often enclosed within a gold shell, and by many men the anterior teeth have been so treated.

The supply houses have aided in this wholesale use of the shell crown by furnishing the so-called crown blanks in an assortment of sizes for differences in peripheral measurements and in several gauges of metal, making it easily possible for the thoughtless operator (to characterize him all too charitably) to apply such structures to any of the teeth with a slight effort in less than thirty minutes. Such practice is largely accountable for the frightful disfigurement of multitudes of people displaying these hideous evidences of dentistry upon any of the teeth, the

*Read before Southern Illinois District Dental Society, March 9, 1915.

favorite choice for such display apparently being the upper anterior teeth. Unfortunately for all concerned, this practice has not received the condemnation it deserves from the people at large, because of its real serious detrimental influence, but mostly as a protest against the glaring assault these gold teeth are to the beauty nature normally confers upon the individual appearance with good teeth. Because of this more than from any other observed defect has the thoughtful patient learned of such abuse. Were these methods condemned because of the menace they exert against a healthy gum tissue and consequently a long service, but probably greatest of all because of the constant menace they exert against the general health through the intolerably septic conditions usually found associated with them their employment would long ago have been deservedly minimized.

How incapable the individual is of recognizing any of the essential failures of these crowns to fulfill the requirements of a satisfactory restoration may be illustrated by the following typical instance. A patient for whom the writer was doing work was told a certain tooth had so far disintegrated that it seemed advisable to restore it to usefulness with a shell crown. The cost of such work, the patient reflected, was considerable, but said he, "The tooth here" (indicating an upper bicuspid) "was crowned ten years ago and has been always satisfactory." The crown he referred to had excited my curiosity from the time I first gazed upon and examined it as about the most colossal example of an ill fitting, insanitary effort at a gold crown it had ever been my opportunity to behold, there being no contact with adjacent teeth and because of a marvelous failure to fit the band properly the surrounding gum tissues were inflamed and had lost their attachment to that extent a pocket had formed rootwise such that pus oozed freely therefrom, resulting in a partially loosened root which it was plain to be seen was not used in mastication. The patient's remark this "crown" had been always satisfactory and had been in place ten years was overwhelming evidence that almost any kind of work that does not cause conscious discomfort and will stay in place and "not come out" will qualify as satisfactory dentistry, although from the standpoint of genuine fulfillment of satisfactory service the

crown had failed utterly and would apparently be lost together with the root supporting it at a time when it should have been giving genuine service.

The fact is a shell crown may consist of a misfitting gold ferrule filled with cement and shoved carelessly to place over any tooth and may be depended upon to stay in position just as long as the peridental membrane can withstand the outrage thus perpetrated against it. So loath is nature to succumb to detrimental influences years of time are required to encompass the loss of a tooth from such irritation and thus the failure is seldom brought home to the misguided or sometimes dishonest dentist responsible for it. The disquieting criticism by the English surgeon of so-called American dentistry was incited largely by his observation of many instances of such disgusting conditions which to his mind, and rightly so, constituted so many foci of infection by which the general health of the individual was assailed. The criticism was given wide publicity and has served most excellent purpose. It, however, carried with it, as is usually the case with sweeping condemnation, much unjust conviction to the average mind, as is evidenced by the remark of a physician recently. The physician required some dental attention and it was proposed to him a bicuspid tooth extensively decayed would best be restored with amalgam instead of a crown. He quickly replied, "Most assuredly—I would not permit the use of a crown in my mouth or that of any of my patients if my convictions were observed!" Now, this physician was a capable and conscientious man and had evidently read in his journals something of the menace insaniary oral conditions have recently been recognized to offer the general health in the widespread attention these conditions have lately been attracting and without intelligent discrimination all crown work was unqualifiedly tabooed. Further, the physician rather proudly cited some cases in his practice in which patients suffering with several ailments, including pernicious anemia, had upon his demand had removed from their mouths crowns which the physician observed therein. The conclusion follows that a competent dentist should pass a careful opinion in such instances and the more the shell crown, as it has been and is almost entirely yet constructed, is given consideration, the more its use must be condemned.

When a shell crown was honestly and intelligently employed by the dentist of genuine ability in years past it often gave real satisfactory service from every standpoint, but very, very few of the shell crowns which have been used were so made. To construct these crowns good practice required the complete scaling of the enamel from the root so that there was formed in theory a cone-like stump with surfaces converging to a point beyond the occlusal surface or with surfaces that were approximately parallel, thus permitting of the accurate adjustment of the band at or just beneath the free margin of the gum. The very nature of the enamel as it sloped from its junction with the dentin near the cementum and continued occlusally to give the tooth crown its greatest diameter in the contact point region made this trimming and scaling necessary and required removal of much tooth tissue in securing the proper cone-like or parallel

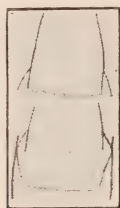


Fig. 1.

surfaced stump. Such an operation was always difficult and as time has shown when shell crowned roots have required extraction the most skillful operators seldom attained the theoretical cone or parallel surfaced stump in spite of their honest and capable efforts, although they were satisfied they had done so at the time of the operation. Working under the free margin of the gum with the vision further obscured by saliva and hemorrhage the fact long ago was evidenced such a procedure is practically impossible of accomplishment, although in theory a most simple operation. When the theoretical cone or parallel surfaced stump was not secured the band unfailingly projected away from the root at some or many points, thus forming a shoulder to collect food debris and not only through their fermentation but also mechanically formed a source of continual irritation to the gum and peridental tissues. Such irritation

can be seen around ninety-nine of every one hundred shell crowns observed even if from the hands of able operators. Fig. 1.

Further objection resides in the greater or lesser mass of cement securing the shell in place because of its porosity and consequent foul, insanitary menace, the odors from which have baffled the most persistent effort of dental writers adequately to describe. A dentist need not be very observing to be so impressed with the impossible nature of accomplishment of this theoretical proper root preparation that adoption of other methods is desirable and it requires no reflection for one observing the universal failure of the shell crown to attain the ideal in any particular, including most certainly the sanitary, to compel the adoption of means to the desired end which would be more acceptable in one's own mouth. Fig. 2.

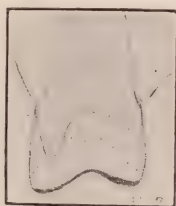


Fig. 2.

The writer has so completely eliminated the shell crown from patients' mouths he with some satisfaction found two shell crowns had been thought necessary in his practice during the past year exclusive of bridge appliances and for the past ten years a similar record would obtain. With the advent of the casting method it became possible to construct a shell crown practically perfect in the sense that a structure may be made devoid of the main objections commented upon. Such a crown is made upon a stump dressed to cone or parallel surface form from either sound tooth substance or if to be used as an abutment for a bridge, and no bridge properly should be made employing shell crowns unless made in this manner or upon a root nearly restored with amalgam built around posts or pins if the crown is to restore a single tooth. A pure gold 36 gauge band is forced rootwise upon the stump and festooned so as to rest at the free margin of the gum or slightly above it, leaving even a millimeter or more of tooth substance visible. The occlusal edge of the

band is then cut in numerous places so that it may be burnished to the stump walls and over its occlusal surface in a manner to form a cap of pure gold completely covering the stump and fitting accurately and glove-like thereto. Upon this cap inlay wax is melted in excess and the cap then applied to the stump and the patient required to close the teeth and make the masticatory movements, after which the wax is carved both while on and off the stump to a correct tooth form. The whole is then invested and the wax replaced by cast gold. The resulting crown is then adjusted and secured to place, making a nearly ideal restoration and requiring but a thin film of cement in place of an excess to become insanitary. The band being away from the gum margin no irritation results and a perfect fit is secured that can be felt and observed and perfectly burnished to position. The tooth substance exposed, if any, is subject to easy repair with amalgam should any decay later occur. Fig. 3.



Fig. 3.

Bicuspids, formerly and even now so often shell crowned, can be gold inlayed or amalgam-filled in nearly all instances through the employment of pins or posts in gold inlays or posts with amalgam. The occasional case requiring a crown can be treated in most cases better with a porcelain combination with gold or amalgam and the disfigurement of all metal restorations avoided. To the writer a more readily made and satisfying gold and porcelain bicuspid crown can be built as will be described than with a cast cope and porcelain. The root is ground to a point well beneath the free margin of the gum and the canal or canals in the case of the first bicuspids are reamed sufficiently to permit of a clasp metal post being carried just as near the apex as possible. This is necessary for proper rigidity and in all instances the post should be at least as long within the canal as the crown portion has length occlusally. Failures are ob-

served from the post being made too short. With the posts made ready a piece of annealed pure gold 36 gauge is roughly burnished to the root face, the post or posts are then thrust through the gold to their proper positions and if the gold will not adhere firmly a spur is run out from the post at one or more points, this being done with a sharp chisel. The post will then be accurately adjusted to the gold while the two are soldered with a minute bit of 22 karat solder. The cope thus made is applied to the root and burnished and malleted with a smooth faced foot-shaped plugger point, trimmed and from time to time a bit of 20 karat solder is flowed over the occlusal surface of the gold to hold it rigidly to place until the entire surface is trimmed to the periphery of the root and made stiff. The lingual surface of the root having been beveled slightly, this portion of the gold is burnished and well stiffened with solder rootwise in order that a firm grasp is secured to offset lateral stress. Often if but one post has been used a supplementary pin of 22 gauge platino-iridium wire is run through the gold plate at a point between the post and the lingual edge of the root into a hole drilled therein to admit of its insertion on an average an eighth of an inch into the root. This provides against splitting stresses and besides adding rigidity also offsets rotating tendency. The soldering if carefully done is easily accomplished, the root face of the gold always being coated with whiting in alcohol and the pickling being frequent by immersion while the piece is hot in hydrochloric acid. The cope being ready, a suitable facing is backed with 36 gauge pure gold and heavily reinforced at its occlusal edge with 20 karat solder. The facing is then adjusted to the cope with hard wax to a proper relation in the mouth and then soldered with 18 karat solder to the cope. The lingual cusp is built up with solder and bits of scrap clasp metal to a proper height and contour. Often a piece of 36 gauge pure gold may better be adjusted to the facing and cope with hard wax in the mouth to facilitate the contour and cusp formation. Such a crown is of pleasing appearance, is strong and as sanitary and acceptable to the gingival tissues as any crown can be made. There is no mass of cement to absorb secretions and the adjustment of cope and root periphery may readily be made so accurate as to reveal no shoulder or difference in level when examined

with the explorer, and years of use in the mouth will show the gum tissues firm and healthy with a gratifying absence of the characteristic ring of chronic inflammation universally observed about the shell crown. Fig. 4.

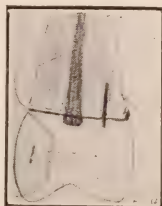


Fig. 4.

An amalgam and porcelain combination crown of perfect crown requirement fulfillment may be made by attaching a suitable facing, backed and reinforced with pure gold and solder, to a properly fitted clasp metal post or posts with solder so that the facing just escapes contact with the root face at the gingival. The post and facing are then set with cement and the root and facing surrounded with a thin matrix band carefully adjusted. Into this matrix the amalgam is thoroughly built when the band is removed and proper occlusion and contour established. Such crowns have done in some instances more than ten years' service and are still in good condition in the writer's practice. Fig. 5.

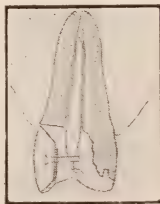


Fig. 5.

In molars the shell crown is easily avoided in practically every instance unless made as already described. The gold inlay often answers admirably of course, but it is our purpose not to give it consideration in this paper, but rather the less often used amalgam substitutes. The large cavities often encountered render the remaining portions of the tooth so weak as to make

it likely splitting off of these parts will result if not carefully provided against. That this may be done it is necessary to cut away freely such portions so that a considerable thickness of amalgam may be built over them to offer an entire occlusal surface of amalgam. This requires the use in nearly all cases of one or more posts let well into the pulp canals properly reamed to receive them. The post may be and usually by the writer is made of platinoid wire, a nickel alloy that is inexpensive and entirely satisfactory. In some cases clasp metal is used. The reamer for the canal is easily made of a long shanked drill ground flat on three sides and tapering to a sharp point and for use in either the straight or right angle handpieces. Such a reamer follows the canal and in a thrice provides the proper form. The posts are quickly formed by grinding upon a rapidly rotating carborundum stone in the lathe, holding the wire against the side of the stone rather than the circumference. The posts



Fig. 6.

are fitted and a head fashioned with pliers so as to render the posts retentive and also delicate in order not to take up too much space with consequent danger of a weak cross section of amalgam. Fig. 6. When ready the posts are cemented in the canals and a matrix band adjusted to the tooth for proper amalgam building. If practically an entire crown of amalgam is to be built the matrix band must surround the root. This can always be done in some manner with the various devices for the purpose. The writer rarely uses a soldered band because of the difficulty of dressing the set amalgam as compared to the ease of doing this work while the amalgam is still fresh and contact points can be made certain and stiff. Occasionally it may be necessary to stiffen the tension of a contact point after the amalgam has set by cutting into the same and building out fresh amalgam.

Your essayist has removed some scores of shell crowns only to build up the tooth with an amalgam crown, in this way to observe a healthy gum result and witness the heavy use of the new crown in mastication when frequently the shell crown had been avoided through lameness or for other shortcoming. The term amalgam crown is used when the entire crown is

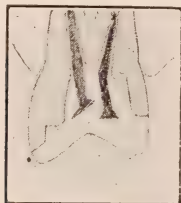


Fig. 7.



Fig. 8.

restored and the term restoration when a very large portion of the tooth is restored. This differentiates between the usual filling, a restoration and a crown and assists in making the patients appreciate the real difference in the work required. Figs. 7 and 8.

In occasional conditions found in vital teeth large amalgam restorations are difficult, owing to loss of tooth tissue being so great no opportunity is given for cutting secure retention. In these days when so much evidence is before us in radiograms of the difficulty of perfectly filling root canals we are more than



Fig. 9.

ever anxious to preserve pulps, for as has been well said, "the most perfect root filling ever devised is a live pulp." In such cases a resort may be had to small platino iridium pins of 22 gauge let into holes drilled in such positions as not to endanger the pulp. The holes are of a diameter to allow the pins entrance therein with an approach to snugness and after suitable heads

have been formed upon the pins two, three or four of them are cemented in position and the amalgam built about them with the aid of a proper matrix. Large restorations can be made in this manner in vital teeth that at first seem beyond such repair without devitalization. Fig. 9.

Now and then we encounter a badly broken down root which has portions decayed under the gum margin or is gone so badly the entire root periphery is under the gum. A matrix cannot be accurately adjusted in such cases and the condition is a desperate one, although often the loss of the tooth will be unusually great. Desperate conditions call for desperate measures and in many such instances some requirements of the ideal must be sacrificed. In these cases a pure gold band is made to a measurement of the root in the same manner as the usual shell crown band, though the gold is pure and of 36 gauge. This is made to embrace the root periphery with more or less difficulty, but owing to the pliability of the thin gauge and pure metal this can be done in such manner as to make a tight fit. Then

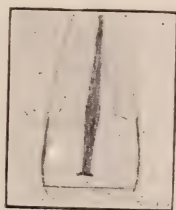


Fig. 10.

the band is contoured to contact and made to just escape the occluding teeth. The contact and contour are secured with 20 karat solder properly added, which at the same time stiffens the band against distortion. The band thus treated is then set upon the root with a small quantity of cement. While some gum irritation may follow, the desperate nature of these cases must assuage our chagrin at such necessity. The canal having been reamed out and a post set with cement therein, we now have conditions ready for the packing of amalgam firmly within the band and about the post, thus making a structure that is serviceable, durable and satisfying save for some gum irritation which may follow. In all cases the packing of large amalgam masses

may be made firmer by the use of a blunt faced plugger hand malleted against the amalgam when nearly finished. Fig. 10.

The writer has felt keenly for a long time the shell crown should be abandoned as usually made. It has been a conviction that as more positive knowledge is had of the real dangers of insanitary mouth conditions to the general health the conclusion will follow that probably the shell crown has done far more injury and harm than it has ever done good. To the popular mind this will react upon dentists and our work unfavorably and will assist in bringing about a higher type of service. Already the conscientious dentist has felt this and has been alert to so modify his procedures as to make criticism less just. Thus this paper is offered that attention may be directed toward methods which are modern day good practice in place of the antiquated gold shell crown.

RELATIVE VALUES.

BY J. P. HARPER, D. D. S., DEAN ST. LOUIS DENTAL COLLEGE,
ST. LOUIS, MO.

For those interested in the best achievements of our profession there comes the important question,—are we graduating capable, practical men, qualified to properly perform the ordinary dental operations required of the dental practical practitioner? Different answers are given. Members of the Dental Examining Boards, who have an immediate responsibility, will tell you that a very large per cent of students who present themselves for examination for licenses to practice dentistry are deficient in skill, that it takes them hours to perform the practical operations required of them, operations that one of ordinary ability should be able to do in a much shorter time. On the other hand it may be, and is claimed that it is not the function of the dental school to graduate the expert mechanic or operator; that its sole function is to instill proper ideals and to teach correct method; that digital skill will come with practice (on the public).

The dental school is bound to consider the merits of these divergent points of view on the basis of its obligation to the

student and to the public. The graduate has the right to expect a training that will enable him to carry on his profession effectively from the beginning; the public has the right to demand professional proficiency of those to whom we have given diplomas certifying to their efficiency as dental surgeons. Since practical skill is fundamental in the successful practice of dentistry we are obliged from both of the standpoints mentioned to give paramount attention to this field in the work of our dental schools.

What are the facts? A high estimate of the hours a student gets in actual practice at the chair in the average Dental Clinic is two hours a day for thirty weeks during his senior year, and half that time during his junior year. This allows the student five hundred and forty (540) hours in all, or about two months of steady time to master the essential part of his profession, art, or trade as you may see fit to call it.

Is this an adequate allowance of time? It takes four years for the machinist, plumber, or other high grade mechanic to be qualified as a journeyman in his practical trade. No school of stenography, telegraphy, or even barbering and chiropody would dream of granting a diploma of proficiency to their graduates after but two months of practical operative work. Yet our dental schools are doing this.

A realization of our failure to do our duty by the public has caused a strong concerted movement over the country to increase the term to four years. But a study of the curriculum proposed by some of our leading universities shows that practical operative work is postponed to the third and fourth years, and that the additional time is to be used in the study of such subjects as General Biology, Rhetoric, History, Economics, Language, etc. This procedure will no doubt result in the graduation of more cultured men. But the important question is, will they also be more capable, practical dentists? Experience shows that elevation of the dental profession has meant merely the incorporation chiefly of medical subjects, while the dental subjects have been standardized. Such copying of the medical curriculum can only lead to the graduation of unskillful dentists. Is it not probable therefore that in our desire to have the profession rank high as a branch of medicine, we have lost sight

of the dental school as an independent institution whose true function it is to graduate students fully qualified to carry out the specialized duties rightly expected of them by the public?

It has been well said that dentistry is nine-tenths mechanics and one-tenth surgery, which is the mechanics of medicine. It is practically an exact science. Observation shows that professional success is largely correlated with financial success, which in its turn is based upon the dentist's practical skill. A list of those who become prominent in the dental profession also shows that their success has almost invariably been based in the first instance upon their skill as practical dentists. We may predict therefore that those of a graduating class who will make the greatest success are those who are most proficient in the practical branches.

The increasing tendency to put the emphasis upon medical and theoretical branches of dentistry can only accentuate the present condition. What we need is to study relative values in the curriculum of the dental schools and to realize that the "university idea," while good in its place, is not applicable in the teaching of dentistry.

In view of the fact that fully 95% of the operations that the average dentist is called upon to perform require primarily digital dexterity and skill, it seems but rational that the medical and "culture value" subjects should be subordinated to the practical branches of dentistry even if the "branch of medicine" idea suffers thereby. Let our aim be the graduation of skillful dentists whose standing in the community will be what they deserve, and who, having the culture that flows from efficiency and skill, do not attempt to bask in the reflex glory of the medical profession.

PRESIDENT'S ADDRESS.*

BY DR. H. F. HAGEMANN, ST. LOUIS, MO.

Mr. President and Members:

In accepting the all-important position of president of the St. Louis Dental Society, an honor for which I am deeply grate-

*Read before the St. Louis Dental Society, Jan. 5th, 1915.

ful, I feel that I have undertaken a very grave responsibility, the sense of which has grown upon me, as I begin more fully to realize the obligations that it entails. This society has long been the leading factor in the dental profession in the State of Missouri, and as such, a high standard of excellence must be maintained. My predecessors can look back upon their various years of service in office, with the proud satisfaction of work well done, for our society has been prosperous, our membership has constantly increased and the high character and excellence of the essays read and the lectures delivered before this body, have most certainly been of great benefit to all those who have had the pleasure of hearing them. I therefore repeat that I feel highly honored, and fully realize the many duties and responsibilities of the office to which you have elected me.

It will be my ambition to carry the banner onward and forward, and with your loyal support and hearty co-operation, I too hope to be able to look back a year hence at a task well done, at a year's work rich in concrete results and full of definite strides of advancement. To accomplish this I will need the honest support of each and every member of this society, the co-operative support of the entire organization. Your Executive Committee will strive to arrange a program which will be of interest to all, and will, to the best of their ability, endeavor to carry out the fundamental objects of our local society; aside from the promotion of social intercourse and good fellowship, that of serving as a post graduate course for its members. In selecting the essayists, we will pay special attention to those subjects which are of particular interest and importance at the present time, new developments and advancements of which we are all anxious to learn. In this connection I will say, that any suggestions that any member may have to offer to help make the year's program a success, will be gladly received and duly considered.

To formulate a program which will be of educational value and meet the demands of an energetic and progressive body of men, such as I know you to be, is no small task to be undertaken in the short time allowed by our present system of election and installation, so I will later recommend a change in the by-laws that will give the newly elected president and his committee

more time in which to gather material for this all-important task.

There is no greater reward, and nothing pleases and enthuses an essayist more, after the hard labor and hours spent in the preparation of a paper or lecture, than a large and attentive audience, together with discussions which ring with the clear note of preparedness. So I would earnestly request that we all show our honest appreciation of the efforts of our essayists by being regular in our attendance, and entering into the discussions with all the enthusiasm at our command.

It is not so long ago that dentistry was looked upon as a mere mechanical trade. Those especially skilled were honored by being called artists. It was a generally accepted fact by members of the other professions, especially the medical profession, that little education was needed to become a dentist. A few months of training in some dental office was all that was deemed necessary. This was proven by the attitude taken by the trustees and managers of the University of Maryland, when petitioned in 1839, by a committee of dentists for a dental department, so that dental students might acquire the advantages of an education such as the medical colleges afforded. The rejection of this petition was responsible for the establishment of the Baltimore College of Dental Surgery. This marks the commencement of our struggle for recognition as a learned profession. For seventy-five years we have striven for higher ideals and general advancement, so that we might better serve humanity. With the history of this progress, you are all more or less familiar, and the essayist, who is to follow me, will refresh our memories on this subject.

The general problems with which we are grappling are analogous with those of the medical profession not so many years ago. The old "family doctor" treated symptoms entirely. Observation was the one important means of diagnosis. The appearance of the tongue, the skin, the eyes, etc., decided the course of treatment. Blood and urinary tests and microscopical examinations were rarely thought of, and their knowledge of bacteria was nil. Their progress has been phenomenal, yet it has taken many years to bring it to its present state of development.

The science and practice of dentistry has made great ad-

vances, especially during the last few years. That which stands out most prominently, among the more recent developments, is the better understanding of the evils which result from septic infections in the mouth. The recognition of the importance of this source of infection, as being directly or indirectly responsible for many constitutional disturbances, has done more to bring about a closer relationship between the medical and the dental professions, than any other one thing. The greater the service, that we can render humanity, the greater will be our reward, and the more honored will be our profession. We hold the important position of guardian of the oral cavity, the principal portal of infection to the whole body. It behooves us to guard it well.

When we can demonstrate clearly that our branch of the healing art can save lives, and relieve people of the many sufferings due to hitherto unrecognized sources of infection, then we will have answered Dr. Chas. Mayo's question, as asked by him before the Chicago Dental Society Jan. 31, 1913: "Will they do it?" Will we as a profession bring about the next step in preventive medicine? Will we aid our medical brethren in solving some of the stubborn problems, which have been stumbling blocks for many, many years? We are working along the proper lines and our efforts will ultimately be crowned with success.

Our nation wide oral hygiene movement, the dental inspection in public schools, the establishment of free dental clinics for the poor, both in our public schools and our city institutions, the development of prophylactic work by dentists throughout the country and last and perhaps the most important of all, the establishment of a national research movement. All these activities in the dental profession as they are extended and developed will be far-reaching in their effects upon the people of our beloved country. It will raise the physical, mental and moral standard of the future citizens of the U. S., and will elevate the dental profession to the level for which we have been striving. St. Louis is known as an ultra conservative city and it is therefore not surprising that we have had but little success with our city officials in the establishment of clinics in our eleemosynary institutions and public schools; but let us not be disheartened, but redouble our efforts and, I am sure, we will meet with success. For our Government, City, State and National, will sooner

or later recognize the importance of these movements and lend the necessary support. The warring nations of Europe are finding out the importance of good teeth on the firing line.

I am not a prophet and therefore can not pry into the future, but judging by the trend of the investigation into the etiology of dental caries, that most prevalent of all human diseases, and the interest manifested in solving the problem of that tissue destroying disease pyorrhea alveolaris; that the dentist of the future will spend most of his time making tests of the saliva, blood and urinary analyses and writing prescriptions, which will correct systemic conditions to the extent that caries of the teeth and infections of the other tissues of the oral cavity will be so largely controlled that comparatively few mechanical restorations will be necessary. Dentistry will then be on a strictly scientific basis. We will then be laboring to eliminate the cause of the trouble and establishing preventive measures, instead of merely trying to restore lost parts, after the damage has been done. We will be pulling at the right end of the string. The greatest aid in furthering this scientific research movement must come from our dental schools. As Dr. Kennerly said at our last meeting: If any additions or changes are to be made in the college curriculum, it should be by way of adding studies and lectures which would better qualify the students for this particular line of work. We get plenty of dentistry as the course is today, but are sadly lacking in the allied branches, which would help us to solve the problems which are confronting us in our daily work. We as a society and as individuals should do all in our power both financially and otherwise, to further this research movement for therein lies the secret of our professional advancement.

Reference was made in the earlier part of my paper to the short time the incoming officers had to get up the program for the year and incidentally, the president had to prepare the customary address. So I should like to recommend to this society that we change our by-laws so that we can elect our officers at the June meeting instead of in December, and leave the time for installation in January, as at present. This would give your newly elected officers plenty of time to formulate their plans, appoint their committees, and arrange a program, etc. Besides

giving them more time, it would afford them the opportunity of meeting the men who would furnish excellent material for the year's program at the State and National meetings, which are usually held a little later in the year. This advantage of coming in personal contact and making a direct appeal to a man of prominence, for an essay or lecture, would facilitate matters considerably, for we all know that the men we like most to hear are very busy men and are therefore difficult to secure. I sincerely believe that such a change in our by-laws would be welcomed by future officers and would afford the opportunity for the arrangement of programs which would surpass any that we have had in the past.

There is one thing more I wish to mention and that is the Missouri State Dental Association. I believe our State Association should do a larger work. A greater interest should be manifested in our state meetings. The "Grand Old State of Missouri" should "show" the dental world that it is up and doing. To help bring this about, I believe that the St. Louis Dental Society should take a greater interest in State meetings and State dental affairs. I don't mean that we should attempt to control the organization or its officers, but that our society being the oldest and largest in the State, should take the initiative and work with the other societies of the State to make our Association second to none.

In conclusion, I wish to again thank you for the honor you have conferred upon me and for the splendid corps of officers you have elected to work with me, and I am sure I voice the sentiment of all the officers when I say that we will do all in our power to make this year a success.

SOME OF THE EARLY HISTORY OF DENTISTRY
WITH SPECIAL REFERENCE TO THE INTRODUC-
TION OF ARSENIC BY DR. SPOONER IN 1836.*

BY J. H. KENNERLY, D. D. S., ST. LOUIS, MO.

The first appearance of Dentistry as a specialty of medicine occurs at a very remote period. ¹Herodotus (500 B. C.), in narrating his travels through Egypt, then one of the greatest and mostly highly civilized nations of the world, the "mother of the arts and sciences," notices the division of medicine in that kingdom into special branches, and the existence of physicians, each of whom "applies himself to one disease only and not more. Some (physicians) are for the eyes, others for the head, others for the teeth, and others for internal disorders." How far these physicians had advanced in the science of their profession is not known. It is probable, however, that their knowledge was limited, as well as their practice; the latter, indeed, being circumscribed by enforced adherence to certain remedies and formulas fixed by law, on pain of death for any transgression of the limits.

In the art of Dentistry, if we are to believe the various antiquaries and discoveries of modern times, the Egyptians were far advanced; for, as related by many, teeth filled with gold have been discovered in the mouths of mummies; and such teeth have even been deposited in home museums, where they now remain. A collection in Liverpool is said to contain, besides artificial teeth, "two teeth of cycamore wood set in gold." Accounts have also been received of the finding of gold-filled teeth in mummies from Thebes. These gold fillings, perhaps, will eventually prove to be merely gilded wood; for it is well known that the higher orders of Egyptians caused the mummies of their deceased friends and relatives to be lavishly decorated with paint and gilding. Indeed, several instances of supposed Egyptian gold fillings have already, through the agency of a knife-blade, been proved to be mere gilding on the natural teeth.

The insertion of artificial teeth, however, has been long

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¹From History of Dental Science in America.

practiced. The Hindoos and Egyptians are the first recorded in this branch of dentistry. Belzoni and others have found artificial teeth of cynamore wood in ancient sarcophagi. The mode of fastening was by ligatures or bands of cord, or gold or silver wire, tying the substitute to its natural neighbors. The tenth of the celebrated (Greek) Laws of the Twelve Tables (relating to funeral ceremonies) has, among others, this direction: "Let no gold be used, but if any one has had his teeth fastened with gold, let it be lawful to bury or burn that gold with the body."

Ancient Greece is celebrated as having been the nursery of modern medicine. The medical schools of Cnidos, Cos, Rhodes, Cyrene, and Croton date from or about 500 or 400 B. C. These insured the progress of medical science, under tolerably liberal codes of laws, and aided by the then rapid growth of civilization.

Hippocrâtes (500 B. C.), the "father of medicine," was also the first to enter deeply into the study of the teeth. His doctrines in this regard are now sufficiently familiar to the student. Aristotle wrote largely about 350 B. C. Heraclidus of Tarentum, Herophilus, and Erasistrantus are recorded as dental operators (300 B. C.). The latter deposited in the temple of the Delphian Apollo a "lead en odontogogue, which we should call a tooth-drawer" (forceps) . . . "to prove that (only) those teeth ought to be removed which are loose or relaxed, and for which a lead en instrument will suffice."

The two latter are, we believe, the first recorded as having dissected the human cadaver. The Emperor Alexander, to whose court they were attached, delivered over to their tender mercies such criminals as were condemned to death. On the first of these occasions, the emperor and his whole court were present. The operation performed was the amputation of an arm; and because the man survived, many of the court fled in terror, believing him to be an immortal. Such being the extent of the knowledge then possessed by cultivated persons as to the effects of hurts on the body, we may in it find an indication of the probable amount of physiological knowledge of the physicians themselves.

Celsus lived about 100 B. C. He was the first to recommend

the use of the file in the mouth; saying, that the points of a decayed tooth, which hurt the tongue, should be removed with an iron file.

Galen (A. D. 150) has treated the subject of the teeth more extensively than any other of the ancient authors. He taught that they were true bones, that they were formed in the foetus, but did not become apparent until after birth, and even declared that the canine should be called eye teeth, because they received branches from that nerve which also supplies the eye.

Aetius (Arabian, A. D. 300) discovered the foramina in the roots through which the nerves and vessels enter. Albacasis, another Arabian physician (about 1100 A. D.), gave rules for the replacement of lost teeth by substitutes, both natural and of animal bone or ivory.

Some extracts from a curious and rare old work, by "Helkiah Crooke, Doctor of Physicke," published in London in 1618, will be of interest as slightly indicating the character and extent of the physiological knowledge of that time.

"That they (the teeth) are bones some men do deny, first, because bones are insensible, the teeth sensible. Secondly, because the bones have certaine limits of action or increase, neyther do they ever grow againe if they perish, but in teeth it is quite contrary. Thirdly, because they are harder than other bones. Fourthly, because bones exposed to the ayre do grow blacke, whereas the teeth do keepe their whitenesse. . . . Finally, say they, there is a stone that will consume fleshe, called therefore Sarcophagus, which within forty days will devour the whole body except the teeth. If therefore the teeth were of the nature of bones, they also would be consumed.

"They were made very hard that they might not weare so soone or be broken in the chawing or breaking of hard things, for they are not lined eyther with fatte or gristles as other joynts are to hinder attrition. The teeth therefore do breake bones, resist the edge of steele, neyther can they easily as other parts of the body be burnt with fire. Hippocrates in his booke 'De Carnibus' ascreibeth the cause of their hardnesse to the quality of the matter out of which they are ingendered, for hee writeth that out of the bones of the head and the jaws there is an increase of a glutinous matter. In that glutinous matter the fatty

part falleth downe into the sockets of the gums where it is dried and burnt with the heate, and so the teeth are made harder than other bones because there is no cold remaining in them."

With the later authors on this subject all may be supposed to be more or less acquainted. Indeed, the above have been mentioned, less for information than to point out the inconsiderable germ and slow first growth of that which has since expanded into modern dentistry.

At the last part of the eighteenth century the anatomy and physiology of the teeth had become almost as accurate and completely demonstrated as it is at this day. A survey of the labors of scientists since Pare, Hunter, Fox, Bell, and Nasmyth will, it is believed, yield comparatively little of important discovery. It is true that the general scientific understanding of these subjects has become more correct and comprehensive. But the advance of theory has not been equally rapid with that of practical knowledge and attainments.

In the latter particulars there was then, certainly, a wide field for improvement; and no one need now be told that the field has been well utilized.

Lest we dwell too long on the many interesting things given us by the delvers in the early history of our profession, we will take up the consideration of a subject that has been and will always be of vital interest to us.

For our present consideration, I have selected from the history of operative dentistry one single instance, the introduction of arsenic into dentistry for the purpose of painlessly destroying the dental pulp. The removal of the dental pulp and the subsequent filling of the root canals was practiced already by conservative operators in the middle of the 18th century. Fouchard, Bourdet, Koecker and others describe it as a common procedure and from a copy of a statement rendered by Dr. Hudson, of Philadelphia, in 1807, we are informed that he filled "the fangs to their end with gold." Nevertheless, the methods used for the removal of the pulp were by no means satisfactory, they usually consisted in "knocking out" or destroying it by a home-made broach or by caustics; the latter, however, were very undesirable indeed.

Therefore, the introduction of arsenic into dental thera-

peutics for the purpose of destroying the tooth pulp without pain marks a milestone in the evolution of conservative dentistry. The dissemination of the knowledge of this discovery within dental circles we owe to Dr. Spooner, who, in 1836, published a most interesting little volume entitled "Guide to Sound Teeth, or a Popular Treatise on the Teeth." Parenthetically, it may be observed that no specific current dental literature was in existence at that time and that comparatively few medical journals tried to spread the progress of medical and, incidentally, dental knowledge. The journals were seriously hindered in this laudable effect by the extremely difficult methods of rapid interchange on account of the very limited extension of the postal service.

Spooner's introduction of arsenic into the dental world is best told in his own words.

"When decay has extended to the nerve, and causes the tooth to ache, extraction is the usual remedy resorted to by all who have sufficient resolution to induce them to undergo the operation. The teeth are so liable to caries in this country, and often decay at so early an age, and so rapidly, that it is a matter of very great importance to all, especially to those who have been so unfortunate as to lose many teeth, whether some means cannot be devised for their preservation.

"When the nerve of a tooth has been so much exposed by decay, as to leave no hope of curing it but by extraction, it were much to be desired that medical science should lead to the discovery of some principle, that would quickly extirpate fleshy substances, or at least their diseases, without at the same time acting on the bony structure of the teeth.

"This desideratum has been happily discovered, and its success has been thoroughly tested, in a practice of many years. The nerves of the teeth may be certainly and effectually destroyed, with little or no pain to the patient, and without the least danger, by means of a little arsenious acid (arsenic, ratsbane) applied to the nerve.

"We claim for our brother, Dr. J. R. Spooner, of Montreal, the credit of this invaluable discovery, and for ourselves no small share of credit for thus frankly laying it before the dental profession and the public.

"We have proved that the vitality of the fangs of the teeth, which is necessary to prevent them from acting as foreign bodies in their sockets, does not depend upon the internal membrane or nerve. This fact is of greater importance than one would suppose at a first view, for thousands of aching teeth which are daily being extracted, may be effectually preserved by taking advantage of it. This is a matter of much moment to those who have been so unfortunate as to lose many teeth.

"So complete and satisfactory is the operation of arsenic in destroying the living fibre, that, instead of extracting teeth whenever the nerve is badly exposed, we destroy it, plug the teeth, and thus preserve them. Teeth thus treated will often last a great number of years, and prove highly serviceable.

"Arsenic will not only positively destroy the nerves of the teeth, but it possesses the great advantage, that it does this without causing pain! If it be applied to an aching tooth, it slightly augments the pain, but when applied to a nerve, not inflamed it does not cause any pain, worth minding! Of late, we have applied to aching teeth, a mixture, composed of arsenic three parts, and acetate of morphine one part, the morphine (one of the active principles of opium) being the most powerful odontalgic remedy (remedy for the tooth ache) that we know of. Thus the most violent tooth ache may be effectually cured, without additional pain, a circumstance well worth considering. We cannot too strongly recommend this treatment to the public, under the circumstances we are treating of. No selfish views evidently actuate us in making these declarations. They are not the puffs of pretenders. They are not involved in mystery, but we explain the whole. 'The Royal mineral succedanium,' involved in the mystery of empiricism, a worthless thing, excited great curiosity in New York last year. We doubt if this truly valuable discovery will excite any interest; hence we are a little anxious to urge it.

"Arsenic is the only substance with which we are acquainted that will effectually destroy the nerve of a tooth. Nitric acid and nitrate of silver (lunar caustic) have been much employed for this purpose. They were favorite tooth ache remedies with Hunter and Abernethy, but they do not generally do this effectually; they only destroy the surface of the nerve; indeed but

the small portion of it exposed; besides they destroy the tooth. A hot wire is the remains of barbarism, cruel as death, and does not become the present enlightened day.

"A drill, as well as the hot iron, is very painful, and is enough to strike horror to the soul of a patient. The arsenic effects the object like a charm, and under proper management, never fails of complete success. Many persons of course would be apprehensive of danger from its use; the eighth of a grain of arsenic is a common dose in medicine; the twentieth of a grain is quite enough to destroy the nerve of any tooth. But let no ignorant person dabble with this remedy. As we recommend it so strongly, it is a duty incumbent on us, to caution the public. There are many who would have no hesitation in filling a large hollow tooth with arsenic, on the strength of this recommendation. There are some who do not even know what it is! We know of one instance, but one, thank Heaven, in which the application of the remedy was attended with fatal consequences, and we merely mention it as a warning to presuming quacks.

"A man having a violent tooth ache, applied to an ignoramus for relief, who having heard that arsenic would destroy the nerve, proceeded to fill the tooth, which was very much decayed, with this substance and did not properly confine it. The man returned home; the pain continuing, he took a hearty dram; the arsenic was swallowed and the man poisoned.

"We have used this remedy in hundreds of instances, without ever experiencing any ill effects, nor can any danger ever attend its proper application.

"Whenever the nerve of a tooth can be preserved, it should not by any means be destroyed.

"If the nerve of a tooth be much exposed, we think it much the better practice to destroy it at once, by means of the arsenic, and then to plug the tooth securely. All other methods of treatment are often abortive, and if successful, the nerve often dies away gradually."

Judging from the various writings of Dr. Spooner we are impressed with the fact that this gentleman was a bright and educated scholar, having published some medical and dental essays in both Latin and English. The work referred to above went through a second edition in 1838 and the many favorable comments which this book received and which are published in

the preface of the last edition testify to its high character. From a historical point of view, it is well worthy of remembrance that the use of arsenic for the purpose of destroying the pulp had been employed prior to Spooner's writings. Chapin A. Harris tells us that flystone or ratsbane, which is the common name for crude arsenic, had been employed for similar work by some practitioners of his acquaintance, but, as we stated above, the methods of inter-communication at this period were extremely limited; no specific dental journal existed at that time (the first dental periodical in this or any other country appeared first in 1839, under the name of "American Journal of Dental Science," being published by E. Parmly, E. Baker and Solomon Brown). We must further remember that the individual practitioner was extremely jealous of any special knowledge which he happened to possess and usually guarded his knowledge very carefully. Like all discoveries which are destined to bring about a revolution of existing methods, the introduction of arsenic into dentistry met with violent opposition. This feeling we can readily understand when we consider the extreme poisonous nature of the chemical and the then existing absolute ignorance regarding its pharmacologic action. As late as 1847, merely to cite one instance, we read in Burdell's little work:

"Teeth, their structure, diseases and treatment," as follows: "Arsenic is so called from an Arabian term to denote its strong and deadly power. There are various kinds of arsenic, but the powder in general use, known by the name of white arsenic, is arsenic acid and is accounted a more deadly poison than any other kind. It will sometimes cause death, though taken in quantities so small as to be insensible to the taste when diffused in water. But of its use by dentists, for the purpose of destroying the nerves of the decayed teeth, is what I wish to speak of more particularly; which practice cannot be condemned in too severe terms, as cases are numerous of its injurious effects upon the constitution, when used even in small quantities for this purpose; some of which have come under my own observation. When used in dental practice it is distinguished by different appellations, and combined with different substances while individuals are not aware of the article used in their teeth. When applied to the nerve of a tooth, it penetrates the membrane which becomes much diseased and is absorbed by the

system. The face and entire jaw are often affected with inflammation and ulceration and finally a portion of the jaw exfoliates and crumbles away. The whole nervous system becomes inflamed and diseased, thus preparing the way for that most painful disease *tic doloureux* and sometimes causing it. Suppose you have arsenic applied to the nerve of the tooth, it will act until its strength is wasted; the action is toward the brain and spinal marrow. It may destroy the nerve in the tooth, and go on half way to the brain, or wholly to it, carrying death to the parts which can never recover."

Similar expressions of others who had not made a careful study of the drug are found in the current literature of the early 40's and 50's. We must remember that modern dentistry was then in its infancy and although the United States is the cradle of practical dentistry, very little was done in regard to scientific investigations prior to the above date. Mr. L. Koecker, one of the foremost dentists of international reputation, states that: "In the United States although little or nothing has been done in the way of publishing upon the subject of dental surgery, yet I feel myself authorized to say that in no part of the world has this art obtained a more elevated station."

Again, there were comparatively few men whom we are pleased to call at present ethical members of the dental fraternity, as we are informed by the following statement:

Every part of our country is overrun with ignorant and pretending persons who assume to discharge the functions and duties of this profession; and having dignified their names to the title of doctor they travel about the country, imposing upon the people, doing their teeth a vast deal of injury, in consequence of which the profession is degraded, and public confidence in its utility almost wholly destroyed. Nor are these sapients confined to the country; they abound in our own large towns also. There are 70 or 80 dentists in New York (1838) and out of these Mr. Parmly informs us that he thought there were about twenty who understood their profession and practiced it faithfully.

The foregoing sketch does not at all complete this interesting epoch in the evolution of American dentistry, but for fear of boring this audience with a too lengthy discussion we beg to say Adieu at this moment to return to it at some future time.

THE VOICE IN ITS RELATION TO ARTIFICIAL TEETH
(PROSTHESIS)—SECOND PAPER.*

BY DR. J. H. WOOLLEY, CHICAGO, ILL.

Some one has said that nothing can be known with certainty except by an appeal to facts.

There are but two methods of reasoning which are known as inductive and deductive methods. The latter, the deductive process of reasoning, its definition meaning observation, verifies and classifies all facts obtainable pertaining to the subject matter, with a view to grasping the general principle or law that underlies the observable phenomena. There are dangers and pitfalls in our investigations, such as the tendency of the mind to generalize from an insufficient number of facts.

Referring to this tendency which may be inaccurate observation, insufficient verification, and a tendency to assemble facts into factions or a formal expression of opinion, it many times in our investigation happens that we find our facts do not fit our theory and upon reflection and experiments console ourselves with this idea that exception proves the rule. This leads one in error, for there is no exception to the laws of science or natural law. "The physical attribute of a science has within itself the inherent principles of perpetuity." Hudson says: "A proposition or principle of natural philosophy once established is as firmly fixed as a proposition in mathematics—as is never afterwards disputed. Every step herefore is a step in advance."

I have endeavored to prove in the subject matter of my paper the principles of inductive reasoning by the aid of mechanical philosophy in its application to the human voice.

In this very brief study of inductive reasoning it is my purpose to try to show its application to mechanical philosophy which leads me to the subject matter of my paper for your discussion.

My observations have been led in the study of elocution to this fact that so few have had their attention called to proper enunciation. We have noticed it in speakers on the rostrum, both lecturers and ministers, and particularly those who are wearing artificial dentures.

*Read before the Odontological Society of Chicago.

In my previous paper I showed briefly the functions of the teeth in the production of the articulate sounds; that these sounds are produced by the aid of the tongue in its relation to the teeth, ridge, and palate; and that in the loss of the teeth the equilibrium of the oral cavity is interfered with, and there have to be provided artificial dentures to restore the proper tonal quality of the oral cavity.

The organs of the mouth are so closely related to each other that any defect occurring in one disturbs the true function of the whole.

In supplying a substitute for the loss of teeth we should build upon nature's plan. A dental writer says, "In the formation of consonantal sounds it is this approximate coincidence of shape and close propinquity, that makes the instantaneous application of any part of the tongue to the corresponding part of the dental arch of either jaw so easy."

This it is also that makes any considerable dental irregularity a hindrance to clear articulation by preventing this application of the power of producing certain articulate sounds.

We should consider then that the construction of artificial dentures should be in reference to the proper restoration of their tonal qualifications.

When an architect constructs a hall with a view to the proper sound capacity of the area, his familiarity with the laws governing acoustics determines what ought to produce the best results.

But he cannot at once perfect his plans in harmony with those laws. He has to make many alterations until the echo ceases and the human voice will carry clearly and equally alike in all parts of the hall. So dentures should be constructed with a view to restoring the voice to its natural function, and experiments are often necessary to secure the best results.

I will refer to a case in illustration. A lady singer who had lost her teeth, and in her trial of many different dentures failed to reach clearly the higher register when attempting to sing.

I proceeded in my work of changing the alignment of the teeth by adding to or removing the wax on the anterior bicuspid and molar gingival portion of the teeth as she sung the vowels and consonants until she was enabled to sing clearly in the

higher register, which she was unable to do in the previous dentures that had been made for her.

An impression of her mouth was taken and upon its model a reasonably heavy tin plate was burnished sufficiently stiff to retain its form. After that hot wax was placed upon it in a thin layer. Proceeding further we obtained an articulation to secure the proper relation of the jaws to each other.

Our first study was to form the arch, giving the labial and lingual sides as much space as could be allowed considering the contour of the face. The arch will have to assume the form of a parabolic curve—not too acute at the center of the curve—to allow the six anterior teeth to be flattened or drawn in proper alignment according to the necessity of the case. With this temporary plate in place we proceed to experiment on making certain and various sounds, i. e., the labial, lingual, dental, nasal and palatal.

The patient was instructed to vocalize the labial sounds, which are B, F, M, P, Ph, V and W. F, Ph and V are produced by bringing the upper anterior teeth gently in contact with the lower lip, slightly raising the lips, both upper and lower, to secure the contact, at the same time causing the air to pass out in gentle flow, the lips being passive when the column of air is passing out of the mouth and by no means to be pressed against the front teeth.

The pronunciation of the labial in conjunction with those important dental sounds S and C aid in rightly locating the six anterior teeth, showing whether they are too prominent or depressed or liable to cause a hissing sound. At the same time we consider whether there is too much or too little waxing up of the gingival portions of the anterior bicuspid or molars, as the case may be, when the patient is required to sound certain vowels or consonants at intervals. Following with the lingual, dental, nasal and palatal sounds, we can by manipulating the wax determine the tonal quality as we progress. To recapitulate—study first the functions of the teeth in the production of articulate sounds. Second, observe the application of the tongue to the corresponding parts of both upper and lower dental arches, that any deficiency arising in either jaw, by any irregularity or improper alignment, preventing perfect articulation either in

voice or occlusion may be remedied. Then by building up with wax, or by removing the wax, until the correct relation between the teeth and lips and tongue is obtained, I am enabled to secure results that are highly satisfactory both to myself and my patient.

Let us who are in accord with the best that there is in prosthetic work produce results for the human voice that can make the most gracious sentences sound pleasing to the ear.

Suppose one in passing some certain house hears a violin played and the instrument is ill tuned. How it grates upon the ear and jars upon the senses. It displeases you and is repellent. In walking further you may hear another instrument, its deep and rich tone soothes and inspires. So the melody of the voice can stir one to an appreciation of the best thoughts that lie within us.

My next paper will be entitled "Physiognomy and Expression: A Study."

OUR FRIEND THE BLOOD.*

BY DR. WILLIAM DUNN, FLORENCE, ITALY.

Mr. President, Gentlemen:—

It may appear rather far fetched to commence this modest contribution to the study of the blood, of the human blood in particular, by a reference to the nebular hypothesis and the formation of worlds; but this may establish as good a starting point as any, for we may the more easily and logically follow in our minds cosmic evolution along generally accepted lines, through successive stages of nebular condensation into incandescent gases, these into vapor, then into steam, then into water, till physical stability is reached in seas and oceans; at which stage we may pause to consider:—

Is there any link in our bodies, in our blood, still extant with these primeval times?

There is a strong presumption of truth in the theory that life, as we know it on our planet, originated in the sea; that through successive ages of evolution, every living unit up till man, the highest expression of biological development, was

*Read before the American Dental Society of Europe, at Paris, 1914.

reached, and even man has borne and bears in his blood that much of a primordial state, some of this sea-water, in his blood serum; little more than salt and water, yet admirably modified to suit his present requirements.

Even nowadays, when serious loss of blood must be compensated, the surgeon has not far to seek. He does not have to hunt about for a large quantity of blood to effect transfusion; he prepares his "*physiological solution*" of salt and water and this goes into the veins with practically as good results as if it were rich blood.

Some extremely interesting and significant experiments have not long ago been carried out at the Naples Aquarium in corroboration of our theory.

By subjecting plain, sterile sea-water to radium emanations, observers were able to watch the appearance, the birth of material entities, bearing every attribute of living forms, capable of growing and of absorbing nourishment; this growth went on till a certain stage; then man was unable to supply that undefinable something to support that which he had created; the slender thread of life was snapped and these little beings were beings no longer.

Yet man has gathered enough to understand that sea-water is one of the most likely fields whence life may have sprung.

If we accept this view we can easily fall into line with the modern trend of scientific activity, biological and otherwise, which is striving to interpret phenomena of all kinds by referring them to broad, immutable and fundamental laws, in virtue of which they are all linked into harmonious unity. Let us then agree that blood is modified sea-water. Yet let us not consider it merely as an inert fluid; we must go a step further, and remembering how richly gifted it is with powers of adaptation, of nutrition, of repair, of defence; taking also into consideration that it possesses a well-defined structure of its own; that it is endowed with important and definite functions, we must look upon it as a tissue in itself, a tissue of the body capable of permeating and modifying other tissues; yet like these being formed, nourishing itself; growing and especially reacting upon its environment, reacting to external stimulation. I am still apparently rather far away from a logical connection between these

far-reaching theories and our daily sphere of work on the mouth and the teeth. Yet it cannot escape anybody's notice that in our daily duties we come across countless revelations of these broad and immutable laws at work; and it is the object of this paper to draw attention to the necessity we are under of constantly studying to keep up with the advance of knowledge in general; and to emphasize how much we owe, as dental practitioners, to this protean tissue—our friend the blood.

One peculiar phase of the blood's activity is the power of coagulation, and there is something puzzling about it. If blood coagulates on a wound, why does it not coagulate all the time within the blood vessels? It certainly does not, normally, for we all know what disastrous effects attend the formation of an embolus and subsequent thrombosis. And why does blood coagulate at all if it flows for a time from a wound before it will clot? We know coagulation is due to the action of delicate ferments, enzymes, which come into play at the right moment. Now and then when working on the cervical margin of a cavity has my instrument slipped into the gum and has bleeding been induced. I have waited a few moments and in the natural course of events hoemostasis has set in.

On resuming operations, when blowing hot air into the cavity to dry, I have been not a little surprised to find bleeding commence again, and no amount of persuasion has been of any avail so long as I continued to use hot air; I was destroying the ferments, liquefying the clots and upsetting nature's delicately poised equilibrium.

Another astounding manifestation of the blood's activity is the facility with which it will transform itself into other fluids.

The metamorphosis which chiefly concerns us is the secretion of saliva, which does not materially differ from the formation of other secretions.

The blood enters that peculiar filter, the salivary glands, is conveyed *as blood* through capillaries to the outer layer of columnar epithelium; and behold, when it comes out on the other side of these columnar cells it is saliva; complete, perfect, ready for its functions. Blood on one side of a delicate web; saliva on the other.

Let us but mention the presence in this secretion of diastase, without which starch cannot be digested or assimilated; and the

presence of potassium sulfocyanide, the function of which is not yet clear.

There would seem to be no doubt that the saliva exercises a decidedly beneficial and protective action upon the soft tissues of the mouth and upon the teeth themselves.

An interesting case of congenital absence of saliva has been reported in "*La Stomatologia*," only lately. The child, healthy and normal in every other respect, never had any saliva; result, all teeth which came through softened and decayed away irretrievably. We, as dentists, know how readily cuts and wounds on the gums and soft tissues of the mouth will heal as compared with wounded surfaces not bathed with saliva.

We all know how natural and instinctive it is for children to suck a wounded finger.

An Italian officer who has fought in Africa has told me that natives will spit on the wounds of their brethren when, by the position of their injuries, they cannot perform this function themselves; they do it with the intention of protecting the wound and facilitating its healing. The savage knows more than the civilized man in this respect. Cattle fed experimentally on virulent cultures from bacilli of foot and mouth disease will remain immune, normally; for the thick slime in their mouths will act as a safe barrier; but if thistles are mixed with the food and the oral epithelia are perforated, inoculation is at once manifest.

We have been digressing from our main point; but this digression towards the protective action of saliva naturally leads us to a consideration of the prophylactic action of the blood in itself. Let us not lose sight of the fact that when the blood-flow from the gums has been profuse after extractions or after operations; in fact when the part has been well irrigated by the blood from the inside out, healing of that part is immeasurably cleaner and more rapid. The antiseptic effect can only be attributed to the blood which has passed through the wound, washing away and neutralizing infective bacteria and their toxins. How poor a substitute for this blood-washing is any antiseptic irrigation, none excepted.

Carbolic acid solutions, mercuric bichlorid; iodine solutions, boric preparations, permanganate of potash, all are passing or have passed; but surgery is veering round to irrigations of sterile physiological solutions, our good friend salt and water, the sea-water of our palæozoic ages.

And here we are boarding the question of immunity, the result of prophylactic activity which the blood, our friend, is forever exercising on our behalf. Only of late years have our eyes been opened to the astounding battles going on within us, which our blood is relentlessly waging against ceaseless infection.

It may be well to remind our hearers that immunity, as generally understood, is not a special function; a privilege, as it were, of the blood. All tissues possess this power, to some extent, though the blood has it to a much higher degree.

To get down to principles, we must look upon immunity in the light of general biology; not as something pre-ordained against pathogenic germs for the defence of the individual; but as the general aptitude of the organism to react against divers foreign substances, independently from their being useful or noxious. We may and do have the blood rebelling violently, even fatally against substances which are perfectly harmless in themselves; for instance against repeated injections of sterile serum, and conversely we see it powerless, as in anaphylaxis, against most virulent infections.

Yet the defences set up by the blood against infection are little short of marvelous. If the invaders be germs which enter the blood, as malarial bacilli, phagocytes will play the most important part in the attack, incorporating, eating up the bacilli; should their activity be insufficient, opsonins will be elaborated to stimulate these phagocytes, or aggressines to help them overcome the invaders. If the infecting agents do not enter the blood, but poison it, as is the case in diphtheria, we have the blood developing anti-poisons, anti-toxins, with which to neutralize them.

Then if it be a case of bacilli which enter the blood and carry poison even in their dead selves (cholera), the blood serum develops bacteriolysins for the liquefying and dissolving of these dead germs. And lastly, if the blood cannot act directly upon the invading bacteria, it will clump them together and precipitate them by elaborating agglutinins and precipitins; this is noticed in blood taken from patients laboring under typhoid fever.

To help nature in these struggles man has prepared different kinds of serum, inducing these reactions through animals so as to furnish the products to the infected human being.

By way of curiosity we may just mention that blood is enormously susceptible to these infections. Blood taken from a fowl

suffering from chicken-pox has been diluted to one five-millionth part and yet has brought on the disease in a healthy animal when injected.

It is well to note that a slight infection, by eliciting a slow and gradual reaction of immunity, may be very beneficial and represent a veritable safeguard against dangerous infections. We shall know what power for good may come from diphtheria bacilli, or from pseudo-diphtheria bacilli or other pathogenic germs we may find in the mouths of our patients. It may even be unwise to insist on too frequent or too drastic sterilization of the oral cavity.

We have not the time to more than mention the peculiar union of invading germs on one side and defensive phagocytes and serum on the other. Indeed recent research would seem to establish the existence of a positive state of symbiosis, when invading and defensive forces will, for a time, be equipoised; then there will be suddenly a fresh outbreak of disease, followed by a fresh defensive struggle on the part of the blood (recurrent fevers, secondary infections, etc.).

It is interesting to note the difference of opinion between two giants regarding immunity. Metchnikoff, who holds that cells are the main factors in the defence of the organism; and on the other hand Ehrlich, who maintains that blood serum is the greater protective agent of the two. Probably both men are right; the two theories will only tend to confirm each other when examined in the light of broad underlying principles we have been studying.

We have so far spoken in the highest of terms of the blood; but like all our friends it has its failings, and these we have already hinted at when speaking of anaphylaxis. This is a condition opposed to prophylaxis; is a state in which the blood seems quite unable to cope with infection, or may even rebel at usually harmless invasions. Some poisons act so quickly that they do not give the blood time to organize and elaborate its defences (snake poisons, septic poisons, etc.).

Again infection may go on for some time, unsuspected, and manifest itself when the defences of the system are completely exhausted, too late to save the patient. We have all studied and read of that alarming infection *Angina of Ludwig*, described by our colleague Professor Arnone; I trust only a very few of us have ever come across it.

Patients will come to us with a hard swelling around the neck under the jaw, with a doughy feeling about it; fever; tendency to drowsiness; cachectic condition. No amount of lancing will bring any relief; incisions bring forth no pus; only a slight, reddish fluid will exude. The flesh around the wounds thus made has the appearance of cut liver. Fever increases, the patient goes from bad to worse, sinks from day to day, becomes comatose and dies in a short time. Post mortem examination reveals the story. The blood has not fought the battle. Trouble began by a slight abscess under a root or perhaps under an impacted third molar. Pus has slowly worked its way down through the jaw into the superficial fascia; along the muscles, steadily overcoming lymphatic absorption, till at last it has reached the mediastinum, where death-sentence has been carried out. From the very beginning the blood, in a state of anaphylaxis, has not opposed itself to infection and the patient has lost his life. Yet these cases are rare and I trust that enough may have been said to convince us that in every way, we, as dentists, have much to be thankful for towards our friend the blood.

RECENT ADVANCES IN DENTISTRY.*

BY DR. G. N. GILBERT, PANA, ILLINOIS.

As we look on the wonderful progress the world has made in the past 50 years, we see here and there certain great discoveries that have been stepping stones to progress in the various lines of advancement.

The telephone of 40 years ago, invented by Bell, and the one he used last month in talking across the continent, was improved little by little until now they say it is possible to converse with persons in China.

The wireless stations receiving messages across the ocean now receive at a speed no ear can catch, but the messages are recorded on a fast revolving cylinder which is afterwards slowed down and an operator transfers the dots and dashes he hears to written language on a type-writer.

*Read before the Central Illinois Dental Society, Feb. 16, 1915.

Think of the hundreds of inventions or steps employed in that little trick.

The 42-centimeter guns now employed and the catapults used against the walls of Troy differ only as the mind of man has advanced little by little.

Dentistry of today differs from that of 50 years ago as man after man has placed stepping stones on which we of the rank and file may advance. Let us as dentists look at the journey we have passed and the stepping stones over which we have come. Some of these stones were laid down long before any of us started on the journey.

One of these was vulcanized rubber. Another cohesive gold, then cement. Before that with the soldered gold plate, noncohesive gold foil, poor amalgam and wooden dowel crowns, and the turn-key, dentistry was a limited profession.

But if we look at the work of Harris, Bonwill, Webb and Flagg, we see that dentistry was "on the way."

After the advent of cement came the Logan Crown, then the Gold Crown, then two crowns, and bridge work.

The next stepping stone was laid by Dr. G. V. Black in giving us the quick-setting, non-shrinking alloy.

Next was the invention of Dr. Taggart with the cast gold inlay, then the invisible saliva-resisting silicate fillings of today.

Of course the use of cocain and $N_2 O + O$, porcelain fillings, anatomical articulation of artificial teeth have all been factors in the advancement of dentistry.

All things have come year by year, each year bringing something new, something worth while.

Coming to the year of 1914 what stepping stones have been placed for us? In medicine or surgery, I might mention nerve blocking and the twilight sleep. In dentistry I see two, that all of us may use with profit. One of these, Buckley's desensitizing paste, is manufactured by Eli Lilly & Co. If properly used it takes away the dread of dentistry, which is a "consummation devoutly to be wished." Much of our work today is harder and more trying on account of procrastination caused by fear of pain. How much easier on the nerves of patient and operator if pain can be banished or alleviated. What finer rock could we have on which to advance than a remedy that will take away that dread

of fear? This paste is to excavating what a local anesthetic is to extracting.

The other stone is a real stepping stone large enough for us to rest upon it and see which way to step next. I refer to the use of emetin hydrochlorid in the treatment of pyorrhea.

Last year we invited a gentleman from Kansas City to visit our society and he taught us to use H_2SO_4 in pus pockets in treating pyorrhea. The treatment was beneficial but then we did not know that the reason was because the amoeba does not flourish in an acid secretion.

Last summer a strange coincident occurred. Prof. Chiavaro of Rome, Italy, and Profs. Smith and Barrett of Philadelphia, and Bass and Johns of New Orleans, unknown to each other, were all investigating *Endameba buccalis* and its relation to pyorrhea alveolaris. Prof. Chiavaro read a paper before the American Dental Society of Europe the last of July. Profs. Smith and Barrett published a paper in the August *Cosmos*, and Bass and Johns a paper in *New Orleans Medical Journal* in November.

They established the following facts: First, that the *Endameba buccalis* is an independent form and not a transitional stage of other endameba. Second, that it is always found in the pus pockets of pyorrhea, and that it is always present in unclean mouths but not in carious cavities or in hard tartar.

This endameba is easily recognized, being 5-30 micromillimeters in diameter, from three times as large as a pus cell to less than a pus cell, with but few pseudopods (like feet), but with as many as 20 vacuoles, its endosarc and ecdosarc inside and out sacks, and its nucleus which is not visible in the living animal.

If a smear is made from a pus pocket and placed on a warm glass slide with a drop of normal salt solution the little animals can be seen with a microscope moving their feet like processes and feeding on bacteria.

The amoeba is the smallest form of animal life, a single cell. It belongs to the family of rhizopods or those with hair like feet.

The word amoeba, is the Greek word meaning change or vary, given on account of the animal changing shape when examined under the glass. In moving it projects one or more pseudopodia from the ectosarc and flows or moves in one direction or another, the ectosarc always preceding the endosarc.

The amoeba are found in all pond and river water. Those that live inside the body are called entos, Greek, inside, or endameba.

For 30 years the amoeba has been known to inhabit the mouth but was supposed to be a scavenger, as it was always present in unclean mouths, and known to digest bacteria. But only lately was it given the name of Endameba Buccalis.

These are always found in pyorrhea pockets, not always in the pus but always at the very bottom of the pocket, in contact with the partially dead tissue, right where the destruction is being done, below the pus. This, coupled with the fact that when an amoebicide is used and the endameba destroyed and that the diseased parts recover, established without a doubt in the minds of investigators that the endameba is the cause of the disease pyorrhea alveolaris.

The endameba cannot attack living healthy tissue. Only in some sheltered spot that has been injured, can they get a foot hold; where food lodges, or a tooth pick gouges or a rough edge of a filling or crown impinges on the gums.

When once started their work only ends with the destruction of the teeth. The endamebas are thrown out with the pus and infect spots here and there in the mouth as they become injured until all the teeth are infected and finally lost.

A few years ago it was discovered that amoebic dysentery was cured by emetin, the active principle of ipecac, as certainly as quinin cures malaria, so emetin was tried in pyorrhea with such success that it seems almost miraculous.

Drs. Bass and Johns have experimented with the dosage of emetin, having treated over 300 patients and find $\frac{1}{2}$ grain hypodermatically, that is, $1/100000$ for the average person used for three days will cure mild cases and in six days will cure the worse cases, that is, it kills all the endameba. With all the lesions that exist in the mouth of one who has pyorrhea, reinfection is sure unless precaution is taken.

Here is where the work of the dentist comes in when the gums are not sore, a thorough removal of all deposits is possible. They advise a mouth wash of one drop of ipecac to 4 oz. of water at bed time or on the tooth brush. Ipecac $1/200000$ is an amebicide. Then a repetition of the emetin injections three to six times according to the case is advised, every three or four weeks, repeating about two or three times.

Give nature a chance to heal the breaches made in the mucous membrane, for until they are all healed reinfection will surely take place.

Eli Lilly & Co. make a tablet of alcresta ipecac that is not acted upon in the acid secretion of the stomach and avoids all nausea, but is dissolved and absorbed in the alkaline secretion of the intestine. Two or three of these 10 gr. tablets can be taken three times a day and equal $2/3$ of 1 gr. of emetin, and if given for six days will produce the same result, according to Bass, as if injections had been used. Thus we have a remedy at hand that can be used by dentists and physicians and if they can work together the disease of pyorrhea dentalis, the early stage (Bass) and pyorrhea alveolaris, the later stage of the disease, of which 95% of the people are now afflicted, will cease to be the dreaded disease it has been.

What puzzled scientists for years may now be cured as easily as the yellow fever by shutting out the mosquito, after the cause is once found. How strange, as we think of it now, that we know that they did not look in the right place before for the cause of pyorrhea. The endameba, as I said, is just at the border of the dead and living tissue.

They are not in the pus in large numbers, but below that at work eating, kicking, multiplying and I suppose enjoying life until the dose of ipecac makes them sick and they throw up their job.

The year 1914 will be historic as a stepping stone in dentistry if the treatment proves all the investigators hold out for it, and in my own experience so far it has.

PROCEEDINGS OF SOCIETIES.

FIFTY-FIRST ANNUAL MEETING OF THE CHICAGO
DENTAL SOCIETY.

THE BANQUET.

The culminating feature of the Fifty-first Annual Meeting of the Chicago Dental Society was a banquet given at Hotel La Salle, January 30.

Dr. T. L. Grisamore, president of the Society, officiated as toastmaster.

The speakers of the evening were Dr. Don M. Gallie, president of the National Dental Association, Rev. Nehemiah Boynton, D. D., Brooklyn, New York, and Hon. Champ Clark, speaker of the National House of Representatives.

In introducing the first speaker, the toastmaster said:

The first speaker on the program needs no introduction to any dental audience in America. He is president of the National Dental Association, the largest dental association in the world, and I can describe him briefly by stating that he has held the office of president in every important dental organization of America. He holds the good will of practically every member of the profession, and I now take great pleasure in calling upon Dr. Don M. Gallie of Chicago. (Applause).

DR. GALLIE:

Mr. Toastmaster, Ladies and Gentlemen: When I was invited to take part in the program this evening by the president of this society, I modestly but vigorously protested against it. You all know, especially the ladies know, how much a man protests against having honor thrust upon him, and so when I found the president was about to call my bluff, I heartily said I would only consent on one condition, and that is, that I would not respond for the Chicago men, but simply as the mouthpiece of the National Dental Association, and then only for a few minutes. He then looked at me in a half-satisfied way and said, "Well, Gallie, I never realized that you appreciated the fitness of things so fully." (Laughter). He further said, "I want you in this oratorical or artillery contest to act as a kind of rapid fire. and fire a shot here and there until the audience can get

thoroughly entrenched, and then I am going to bring up one of the big guns, first the gentleman from Brooklyn, and then the other gun from Washington, and then they will fire volley at the audience, and the message they will fire will not be one of dread and of menace and fear, but it will be a message of love, a message of interest, a message of philanthropy, a message of patriotism. (Applause). One will look after our spiritual welfare and guide us in our future destiny, while the other will deal with the material affairs of the world, a gentleman who has charge of the greatest legislative body in the world, the House of Representatives of the United States." (Applause).

It must be gratifying to you and to all members of our profession to see the great appreciation shown by the members of our profession in such gatherings as we have seen today. The slogan of today in all the different callings of life is higher efficiency. Federal, state and municipal officers are striving to bring about the highest efficiency in government. The commercial and industrial interests are doing their best to perfect a system to the end that both employer and employee will be benefited. Schools from the kindergarten to our great universities and professional schools, are shaping their courses so that the greatest number will be benefited, so that it will bring about higher efficiency. Sanitary and hygienic engineers are doing wonders in bringing about better ventilation, in the disposal of garbage and sewerage, the proper handling of tenements and crowded districts, and the question of a pure water supply. And when we consider the social and civic organizations which are legion in this country, working day after day, both men and women, to bring about all that which goes to make up a better life, the consideration of child welfare and of human uplift, and race betterment, it must and does stimulate our profession to take their part in this great work.

We are pleased to see in these great professions, both medical and dental, that their members are doing their share. The men representing this splendid gathering today and the great gathering that filled this room last night came to listen to the words of wisdom from our medical brethren and to discuss the means of bettering dentists. They do not come here to consider the question of fees or how we can benefit ourselves. All

of our meetings are for the purpose of considering what can be best done to take care of the human race. (Applause). This good work is going on not only here but all over the country. It is not a selfish interest that has caused the National Dental Association to grow from 900 members two years ago, to 17,000 today. It is not a selfish interest that has prompted the dentists of this country to contribute liberally towards the endowing and managing of foundations for scientific research. There met this week in the city of Ann Arbor three great bodies to consider the welfare of the people, one the Association of Dental Faculties, realizing that to fit our men to care for the people it will now require four years' preparation, instead of three, so that in the future the course will be four years. At the same time we had the teachers in our various colleges throughout the country represented there, forty-seven of the fifty-three, discussing ways and means of better teaching and preparing our young men to go out and care for the people of this country, and, at the same time, give the finishing touches to one of the most important things that has happened in the dental profession, and that is the establishment of a Foundation and Research Institute in the city of New York which will be similar to the Rockefeller and Carnegie Foundation for the purpose of solving the great problems that confront the dentist, and if we are able to make our medical brethren see that the problems that are troubling us are also the problems that are troubling them, we may expect to accomplish some good. Many of the obscure diseases which they are not familiar with and do not understand can only be solved and understood by united work on part of medical and dental professions. And so it is in every department, and we, I am glad to say, are contributing our share, and this cannot be done by a local society or by any one state society, but it requires national effort. This gathering tonight, made up of dentists from our own state and many from the outside, is calculated to stimulate us to better efforts in trying to bring about these splendid results.

I bid you welcome, and can do no better than use the words that were used last night by our friend, Dr. Carlton, of San Francisco, in inviting us to attend the great dental congress to be held in San Francisco next August. He said some people

who had gone to California remarked that "Everything was for sale." He said they were very much mistaken. And so here, everything is not for sale. Our welcome and our hospitality are not for sale, and that holds good in California, it holds good in Illinois and it holds good in every state in this glorious country, with its happiness, freedom and prosperity, and so I heartily welcome the dentists from the outside, and Mr. Speaker, not only in behalf of the Chicago Dental Society, but in behalf of the dental profession of the United States, I welcome you, the representative of the great federal government, here this evening, and Dr. Boynton, we also welcome you. We are glad to have you with us. (Applause).

THE TOASTMASTER:

It is an inspiration to see a man of exceptional ability, a man of letters, a good man, who, if he had devoted his energies in a commercial way, would have accumulated a fortune, give it all for the good of humanity.

The next speaker has for the past thirty years devoted his entire time to writing, lecturing, and preaching. He has been instrumental in shaping the characters of thousands of young men. I will now call upon Reverend Doctor Boynton, of Brooklyn, New York, to respond to the toast "The Noble Metal."

DR. BOYNTON:

Mr. Toastmaster, Ladies and Gentlemen: I wish my wife were here to have heard the remarks of the toastmaster, even though they are not true, because it would have done her good to have heard them, and it would have done me good after this delightful entertainment was over. (Laughter.)

I must say, you men seem from a distance a very harmless looking company. (Laughter.) You do not look as if you would tread your foot upon a worm, but there is one thing I have found in this world, and that is, you never know what a dentist is going to do next. (Laughter.) I have one satisfaction here tonight, and that is, I have you in the chair, everyone of you, and I am the professional myself just at this moment. (Laughter.) I can be just as polite as you are to me and say, "Just a little that way," and then I will take a table with all the electric things on it, begin to work, speak to you nicely, shove little pellets of cotton into the cavity and elsewhere, and then I will light a little

alcohol lamp, take a pair of tweezers, and put more cotton in, and do one thing after another. Did you notice how the toast-master handled that mallet? (Laughter.) He has had experience. I should really enjoy, beloved brethren, putting into exercise that famous maxim of David Harum, "Do to the other fellow what he wants to do to you, and do it first." (Laughter.)

I always have one advantage in speaking to a company like this, in that a great many people are never quite able to know what my real profession is. In this worldly wide universe there are always a great many people who think I may be something else than simply a sky-pilot. I happened to be crossing the ocean two or three years ago and there sat opposite me at the table a gentleman of the name of Hepp, a liquor dealer in Manitoba, a man better than his profession. He was one of the most genial, one of the most refined, and one of the most intelligent gentlemen I have met in a long time. We got to be friends. We sat together at the table. We walked together upon the deck. We became so intimate that we discussed the infelicities of his calling, and when we had gotten through that, we turned around and discussed the infelicities of my profession, and I found Brother Hepp knew quite as much about the seamy side of my profession as I did about the seamy side of his. When we were about three days from Southhampton, a gentleman came up whom Hepp had met before, but I had not, and engaged us in conversation. He was a broad-shouldered, smooth face individual, who wore a sombrero hat, and who had such an air of confidence that you might believe the Almighty could not vouchsafe him information upon any subject whatsoever. (Laughter.) He told us he had a great country store with all sorts of things in it, and he was going to buy more things to put into it. Among the topics that came up for consideration in our conversation was rubber tire sulkies. But there was a pause in the conversation. The stranger asked me to say something, so I made one of those bow at a distance remarks concerning rubber tire sulkies, when he exclaimed, "Thunder, I want you to see my samples." He started immediately and Hepp after him. I followed along as a minister with his homiletic instinct of making applications, and that sample business troubled me just a little. (Laughter.) I thought I saw a dual application. Hepp looked at me and saw

I was a little embarrassed. When you have been on shipboard for two or three days you will do almost anything. At any rate, we landed in the smoking room. I took a seat at the head of the table, and Hepp, who was a very small man, sat on the other side, and our friend, after taking his seat, threw his chest out and turning to Hepp, whose calling he knew, said, "Hepp, what will you have to drink?" Hepp said, "I will take Apollinaris water." "Oh, thunder," he said, "you are not taking much today." He turned to me and said, "Stranger, what will you have to drink?" I looked at Hepp, blew my face out, looked as dignified as I could, and said, "If you please, I will take horse's neck." It is unnecessary to explain here what horse's neck is. (Laughter.) "Well," he said, "you ain't much." He then called the waiter and said, "Waiter, one Apollinaris water, one horse's neck, and one whiskey and soda, and bring them as soon as you can." As soon as the waiter had gone he turned to me and said, "Stranger, what is your business?" Well, I was having a good time, and didn't want to throw cold water on the thing—at least until the horse's neck arrived. (Laughter.) I said, what did you think I was? "Well," he said, "I don't know. I have seen you walking around the deck here since we left New York, and one day I said to a man, you were one of those fellows at the head of one of those awful New York trusts. (Laughter.) Then I said no, he is not at the head of a trust; he is one of those patent lawyers, but," he said, "when I heard you talk so intelligently" (please note that expression) "about rubber tire sulkies, I made up my mind you were a damn old sport." (Roars of laughter.)

Before I had time to reprove him for the error the Apollinaris water and the horse's neck came. The conversation was carried on a few minutes longer, and inasmuch as he had laid himself open I thought perhaps it was just as well that the truth should be spoken at this time. (Laughter.) He turned round and said, "You didn't tell me what your profession was." I said, "My friend, I am a sky pilot." Poor Hepp, fearful of the outcome, added, "That is just what he is. He is a minister." Our friend looked at the passenger list and said, "You didn't tell me that. I never made such a mistake as that in all my life. Waiter, waiter, more Apollinaris, more horse's neck, and bring it quicker

than you did the first time. I never made such a mistake as that before; I am a Presbyterian myself." (Laughter.)

There is one thing about my identity, and that is, I share the common experience of all men who are evenly yoked in this world, especially the men I see before me tonight. I cannot help thinking of a story, and now the ladies are here I might as well tell it to them. The story is about an English gentleman who invited some of his friends to dinner. He said to his wife, "My dear, you need not sit at the head of the table, but if you will kindly see that the dinner is worthy of our home, I will be very grateful to you." She did not say anything, but she prepared an excellent repast, and the gentleman's friends gathered within and they dined heavily and royally. At the conclusion of the dinner, the host rose and said, "Gentlemen, you are welcome here tonight. The fact is, gentlemen, if there is any one place in this world a man should be absolutely independent, it is in his own home. A man's home is his castle. Every man should be a Julius Caesar in his home." Just then the door opened at the other end of the dining room, and his beautiful wife in all the splendor and magnificence of her evening attire made her appearance, and said, "Gentlemen, the hour is late. Julius Caesar, come along." and he did. (Laughter.)

I am not going to let the impression go out that I peep. That is always the fate of man. I know of one occasion where a man actually got even with the beautiful love of his heart. He had been married, and happily married, for more than a quarter of a century. They went back to the scene of their early courtship, and went out one moonlight evening, just the kind of moonlight when he proposed to her, sat upon the same rock, and looked over the same sparkling water, and as they sat there he got a bit sentimental and said, "My dear, do you remember one-quarter of a century ago when we sat upon this rock one evening?" "Yes, Don, I can remember it very well indeed. Do you remember what I said to you?" "Yes," said Don, "every single word." She said, "Do you remember me saying yes, Don?" He replied, "Yes," and "Do you remember," she said, "Don we were sitting there and I did not say anything for a whole hour?" He replied, "Yes, dear, I remember it. That was the happiest hour of my life. (Laughter.)

I am sure, while we have been sitting here and enjoying the good cheer and fellowship of those in this banquet hall, we have thought more than once of the places here and there, within our personal knowledge, in which there is great need, surprising need, unexpected need. We have a great army of unemployed both in our own city and in greater New York, and we have been asking ourselves some of these basic questions which people ask who find themselves unexpectedly in the extremity of life. You are aware of the fact that in many of our cities tonight in America the people who are in need, because of unemployment, are many of them a different class and a different kind of folks from those who at this season of the year are usually in a necessitous condition. The pathetic thing with relation to want of employment in New York, and I have understood in Chicago as well, is this that people who are as respectable as you and I, who have made as earnest an effort as you and I to husband their resources and to fulfill their obligations in the world, have found themselves by reason of these drastic times through which we are passing not only reduced to the last degree at the point of household economy, but the little savings which they had for a rainy day have vanished, and they are too proud to state the situation just as you would be and I would be. They are suffering, hitherto unknown, wretchedness and misery in the endeavor to fortify and preserve their self-respect. What does it mean we ask? It means many things, but it means one thing sure, that over our country there has come in the last six months, because of this tremendous need, a new spirit of inquiry. I think we may call it the awakening of conscience, not on part of those who are unemployed, but on the part of every class of people who represent work and the profit of the work. I happened to be at a dinner in New York of the Merchants Association when the president of the Steel Company made a speech in which a confession was simply, deliberately, earnestly and most sincerely made, that one of the reasons for the present drastic situation in America was because people, who have had in their keeping the large business relations of our country, had overreached themselves, and principally because of selfishness which never should have been permitted to find its exercise, and the trouble having been seen a

remedy was urged as faithfully and as drastically as the confession was made.

There came to my study one of the wealthiest men of the city the other morning to see me. He had made up his mind that no man in business this year had any right to make a single penny; that he himself not only proposed not to make a penny, but had called in some of his older holdings in an emergency. Such was the situation that men have no right to be making money for themselves these days; that what they make should be shared with the great and tremendous urgency of these times.

Those are but two indications of this spirit which I am calling your attention to, that men in every calling in America today are beginning to cast a sober eye upon the heart of their calling and are beginning to ask themselves if life for them is content in its north and its east, and in south and in its west, simply by the struggle for acquisition and gain, and whether there may not be a higher use for man's life in this great world than simply to baptize him into the single and earnest endeavor to tie up his own resources. Professional life is feeling that same spirit which is reaching out and asking for a new recognition in the great rush of American life.

You referred, sir, in those admirable remarks of yours, to the way in which the medical profession and the dental profession were beginning to ask the question of how effectively and most efficiently they could do what? Fill their pockets? No, thank God, but minister to humanity. You will remember, sir, the commission which was formed by the physicians some years ago to examine all the medical schools in the country and to standardize them, so to speak, and what did they find? They found out of one hundred and fifty-four medical schools in our country, by just simply bringing to bear the limelight of their intelligence and their moral authority upon them, they were able to reduce these schools from one hundred and fifty-four to one hundred and eleven in one year, and then gave it a calm, deliberate and judicial verdict that thirty-one medical schools in our country, properly distributed and properly equipped, would provide all such schools as our country needed. I speak of that as another illustration of the same principle. The days are passing, you know right well, when the physician will con-

sider himself justified in making six calls where only three are necessary. There never were many of those physicians anyhow, but thank God their number decreases in these days, and in your own profession the number of men steadily decreases who will take advantage of the ignorance of patients. There never were many of them, but there are a few, and thank God their number is decreasing.

I was told the other day of a servant girl who went to a young and aspiring dentist, who looked at her teeth and told her it would cost \$14.00 to treat them, or to have the work done. She was quite disturbed, and did not see how she could pay for it. She went home and stated the fact to her mistress who told her to go to her dentist. She replied, "I can't go to your dentist because he is too expensive." However, she went to the dentist who does work for her mistress, he examined her teeth carefully and all he could find was about \$7.00 worth of work. Nobody pretends that in a profession like your own that there are many men who would favor themselves at the expense of a poor ignorant servant girl, but the number of people in your profession who would do that is growing smaller with every month and every year. To speak of my own profession, the ministry, it is not without such things. Some ministers abuse their position, but the number of men in our profession who are in the sacred calling of the ministry, who first line their own pockets with shekels, grows smaller and smaller, and what ought to be the pure, unadulterated spirit of our profession grows finer and purer and stronger. Out of this unemployment situation there is coming a new impulse, the feeling of a new responsibility in all departments of life, and we are beginning to ask ourselves that sole question, whether the biggest thing we can do in life is simply to practice our profession for our own sake, or whether there is an obligation to the world about us to do. We must enter with real manhood and with splendid sacrifice in order to adequately fill up the measure of our days with usefulness, and when the golden sunset of the evening approaches be able to look back upon the years of strength and usefulness in business with the satisfaction which belongs to those with the highest ideals. "Blessed is the man," said Carlyle, "who has found his work." Let him ask no other

blessedness. Another author who might have been classed with Carlyle made this piercing remark, "If you do not take your work like medicine, it won't nauseate you."

People in the world today, especially in our country, are beginning to hear that small voice which speaks for the other interests and for their responsibility. Do you hear it men? In your deepest spirit, as you hear it, be loyal to it, for the great problem before our country is not, after all, the problem of our laws, great and imperious as they are, but the problem of America is the problem of the four square character of the men and women who comprise this country, and the example of the four square character is, first of all, upon those of us who call ourselves professional men.

You remember, Walt Whitman liked to talk about America in terms of muscles and prairies and rocky mountains. One day the poet Sidney Lanier, too soon gone to his reward, a southern poet, spoke to him and said, "Walt, you cannot make a republic out of muscles and prairies and rocky mountains." Republics are made of spirit. We are getting over our youth here in America and the diseases incident to our adolescence are being met and mastered. We are beginning to believe that republics are made of spirit, and that means a four square character. Therefore, it means that you and I are patriots when we stand in the hall of legislation for the noble and the true. We are patriots then, but not all patriots then and there. We are patriots as we go to the particular calling of our own personal life, whatever that calling may be. It is honorable, and let us fill it four square full with a spirit of idealism which in its essence is the spirit of loyalty. Those who hear the voice, those who respond to the voice, will find themselves with a deepening joy in life and a deepening love for their fatherland and will sing with one of our most accomplished American women.

"How beautiful every patriot dreams,

That sees beyond the years,

The amber colored cities rise,

Unmixed with human tears.

America, America, God shed His grace on thee,

And crown thy good with brotherhood,

From sea to shining sea." (Loud applause.)

THE TOASTMASTER:

It is indeed a great honor to have with us a man who holds one of the three most responsible positions in the government of our great country; a man who enjoys an international reputation as a statesman and as a speaker; a man whom not only this country but many foreign countries have seen fit to honor. We will now have an address by the Honorable Champ Clark, Speaker of the National House of Representatives. (Applause.)

Mr. Clark was very enthusiastically received. He said:

Mr. Toastmaster, Ladies and Gentlemen: I thank the toastmaster for the handsome way in which he introduced me.

When I was a lad attending the Cincinnati Law School, one night in answer to a great ovation that was tendered him in the grand opera house, I heard George H. Pendleton say that the "Sweetest incense that ever crosses the nostrils of a public man is the applause of the people," and I believe that is true. At least, I like it. (Laughter). I like praise for deeds well done, and so does everybody else if they were as truthful as I am.

I am delighted to speak to an Illinois audience. This state gave me one hundred and fifty-six thousand majority when I needed it. (Applause.) Before I went to bed that night I knew Chicago had given me close to one hundred thousand majority, but that was not the controlling factor in bringing me here. The real thing that made me accept this invitation to speak here to-night was, when I found it was to be an association of dentists, that I was glad to meet with you because my father was a dentist. (Applause.) I shall never forget the first time I found out a little about dentistry. I was about six or seven years old, and I came in and found my father making a plate of seven teeth, a gold plate with an old fashioned blowpipe. The whole performance astonished me. After he got through with the work he kindly and clearly explained to me how to make a set of teeth. I know right now that he explained to me about taking a wax impression, in the first place, in the mouth, then he spoke of the use of plaster of paris and an impression of that. Then he went on with the model on which you hammer the gold plate.

I will tell you dentists something that most of you do not know. You are not old enough. The resident dentists in that

day, fifty years ago, were found only in the larger towns. The rest of them were dentists on horseback, and my father rode around over five or six small counties like a Methodist circus rider. (Laughter.) He had a pair of saddle bags which would hold about half a bushel. One end was filled with dental instruments and accessories, and the other contained a change of linen and the speeches of Stephen A. Douglas, John C. Breckenridge, and other Democratic worthies. In private my father could out argue any man I ever saw. This is the best time to tell an anecdote. He was not a public speaker. He had a great many Whigs for patients and kept shooting these speeches into them. (Laughter.) He was a good dentist. He was such a good dentist that I believe people in the country sections of Kentucky have plugs in their teeth yet that he put in fifty and sixty years ago. Of course, he did not put them in with these new-fangled things, either gold leaf or silver leaf. I was astonished one day when he told me about the malleability and ductility of gold. He did not say anything about its value. I have found that out since. (Laughter.)

I will tell you another thing you do not know that will help you along. The pictures you see of George Washington with his mouth sticking out grew out of the fact that he had a badly fitting set of false teeth made of ivory plate, as the story goes, and I do not wonder that his mouth is shown sticking out. If the theory of one of my professors at college is true, the dentist will resemble Othello, for his occupation is about to be gone. He taught us that the human under jaw was constantly growing shorter and at no distant date would disappear entirely. We will have no use for it.

I am going to talk to you people from the standpoint of professional men and Americans. Dr. Boynton is a preacher but he is an American. I am a lawyer. That is the serious business of my life. Politics is a recreation and holding office an episode. (Laughter.) But we are all Americans; it does not make any difference where we were born. There are some people pestering themselves and others about foreign born citizens in this country; they are getting hot under the collar—Germans, English and the rest of them. My stars alive, do they believe that crossing a body of water three thousand miles wide will

cause American citizens made out of foreign born populations to forget the land of their birth, the scenes of their childhood, and those things that the human heart cries more for as we get older? Not at all. Does it not stir the German heart to hear the *Wacht Am Rhine*, or the Frenchman to hear the *Marseillaise* sung? Or does he expect the Englishman to remain seated and covered when "God Save the King" is sung? My friend over there (referring to the leader of the orchestra), who is very fond of "Its a Long, Long Way to Tipperary," looks like Colonel Roosevelt, but that does not keep this man from being a good American citizen. (Laughter.) If you want to know the truth, some of those who have become citizens of the United States are more patriotic than some of their ancestors who came over three hundred years ago. (Applause.)

I am going to take a few minutes to talk about another subject. For the last ten or fifteen years every muckraker and pessimist in the land has been able to get a hearing, and they have made a great many people unhappy and made them believe that this country is going to the demnition bow-wows. There is not a symbol of truth in it. With all its faults, this is the best government the sun ever shone upon. (Applause.)

I have always regarded as among the greatest blessings of my life that when I was a boy attending the Kentucky University, one of my teachers was Professor Joseph C. S. Pickett. When he was a young man he traveled in Europe, and while there was frequently in company with an English Duchess, and when they came to separate she said, "Professor Pickett, I am astonished at your politeness, seeing that you have come from a country where they have no queen." The old Virginian, bowing to the ground, said, "Your Grace is mistaken; you live in a country where they have one queen, while I came from a country where every woman is a queen." (Applause.) A finer sentiment was never uttered.

Just after the close of the Civil War Admiral Farragut made a circle of the globe in his flagship. He visited every civilized country and received the honors due a hero, which he was. When cruising in the Egean Sea, he sent a message to the Sultan of Turkey, stating that he would like to call and pay his respects. The Sulton sent a message to him stating that no battleship was

permitted to enter the Dardanelles unless it was commanded by a person of the royal blood. This message aroused the Admiral and he sent a message to the Sultan of Turkey to this effect: "I have on board my ship seven hunderd American citizens every one of whom is a prince of the blood royal in his own land." Suffice it to say, Admiral Farragut had no trouble in entering the Golden Horn. I will tell you how I feel about it.

A few years ago there was a company of Americans traveling in the Old World and with them was a boy, twelve years of age. While they were gazing at the Pyramids of Egypt the boy became weary and fell asleep. A wag thought he would have some fun out of the boy. So surrounded with the mummies of the dead Pharaoh the wag blew a horn in imitation of Gabriel's trumpet, the boy woke up, did not know where he was, as he was dazed, rubbed his eyes, looked around and shouted, "Hurray, hurray, it is the resurrection day and an American is the first man up." (Applause.) Professor Pickett, Admiral Farragut, and that boy were genuine Americans, fit to be compatriots with George Washington, Thomas Jefferson, Alexander Hamilton, and Ben Franklin. Let us see what we have come to and whether we are on the road to the duece altogether or not.

In 1800—I take that as a basis—we had 5,487,344 people only. According to the last census, we had 91,487,586, not counting the denizens of the Sandwich Islands, Porto Rico, and the Canal zone. Let us see where we are going to. If our population increases in the next one hundred and ten years at the rate it increased in that one hundred and ten, in the year 2020 we will have two billion citizens in this republic—four hundred thousand more people than there are on the surface of the globe today. There is no politics in this speech. (Laughter.) That would be entirely out of the question.

I like to praise a Republican when I can find one that deserves it. (Laughter.) Secretary James Wilson, a rampant Republican, and a hard headed Scotchman, did a vast amount of good in the office as Secretary of Agriculture. He held a cabinet office longer than any other man. A short time ago he made a speech in which he declared that if the Mississippi Valley were cultivated throughout its entire extent, on the average one acre

would support one human being, and I believe it. How many people would that include? One billion, two hundred and fifty million people between the top of the Rocky Mountains and the crest of the Alleghanies. Those who live in the Mississippi Valley know that in one hundred and thirteen years the total wealth of this country will be multiplied one hundred and twenty-five fold, and as rated by statisticians at the enormous sum of one hundred and forty-one billions of dollars, which if equally distributed, would give every man, woman and child over two years, \$1,321.35. But there is the rub. While a few reach beyond the dreams of avarice, many have not the wherewithal to feed and clothe themselves, and I am bound to believe that the crowning glory of the statesmanship for saving the humanitarianism and the religion of the twentieth century will be to devise some scheme whereby every man and every woman shall enjoy the fruit of his own labor and to prevent any one man from monopolizing the fruits of the toil and sweat of the lives of thousands. (Applause). Blessed be the name of the man or men, and I say it without regard to politics, who shall establish peace between labor and capital, which should be friends and not enemies, and the signs of the times indicate that that dream is not too fantastical for entertainment, and I reverently and fervently thank Almighty God tonight that a Missourian started it—N. O. Nelson of St. Joseph, when he established a profit-sharing business with his employees. Some of the great railroad companies—and it is a positive pleasure to be able to say a good word for them in this day and generation—and some of the great manufacturing plants, notably Ford, are establishing pension systems for their employees, incapacitated from age or disease or accident that puts to blush the liberal pension system of the Federal government for the volunteer soldiers of our various wars. If our wealth increases for another one hundred and thirteen years at the rate it did in the last one hundred and thirteen years, the total wealth of the United States will be twelve trillions, six hundred and twenty-five billions of dollars, a sum so stupendous as to be incomprehensible by the mathematical powers of the human mind.

In 1800 our territory was circumscribed, beginning on the east, with the Mississippi on the west, the Great Lakes on the

north, and the Floridas in the south. We did not have to go to the Gulf of Mexico. Now it extends from Porto Rico to the east and the Lord only knows where in the west.

Within the memory of men here tonight the remark was sneeringly made, "who reads an American book?" I will tell you who asked that question. Sidney Smith. It was the Reverend Sidney Smith, one-third preacher, and two-thirds wit. I will tell you what was the matter with Sidney. He bought some Pennsylvania bonds on which there was a default in the interest, and he was not in good humor. What is the answer to his sneer? Last year there were printed on European presses more copies of General Grant's Memoirs and of James G. Blaine's Twenty Years of Congress, and Jefferson Davis' Rise and Fall of the Confederacy than of any other European historical publication. Who reads an American book now? Everybody who has any sense. (Applause.)

In 1800 we were a feeble folk, a fourth-rate power, of little weight in the world's calculations and plans. Now, we are easily in the front rank, and if we are faithful to the principles of the Fathers, in the year 2020 we will be easily the first and the rest of the nations struggling for second place. There is not a king, emperor, czar, prince, potentate on earth that does not lie awake trying to find out what we are going to do next; and the President of the United States, whoever he is, has ten times as much power as any king on the face of the earth because the minute we elect a president in this country he becomes the president of all of us till the next election, and then we take another turn at it. (Laughter.) He is our president, whether Democrat, Republican, or a Bull Mooser.

In 1800 the majority of the people of the United States could not read nor write. A majority of the soldiers to achieve liberty in the Revolutionary War signed their names with a cross bar. According to the last census, less than eight per cent. of the white people of the United States were classed as illiterate. When George Washington was sworn in as President of the United States the first time, there were thirteen schools and colleges in the United States, every one of them in imminent danger of dying of anemia, that is, poverty of the blood. Now, there are a million of ambitious boys and girls preparing themselves for the onerous duties of

American citizenship in five hundred well equipped universities and colleges, to say nothing of the high schools and academies. I myself have lectured to one audience made up entirely of teachers and pupils of universities that numbered more men than did the army with which Sam Houston established the liberty of Texas in the red fields of San Jacinto.

In 1800 churches, like angel's visits, were few and far between. The advent of the preacher and priest in the community was welcome. Now, the average citizen lives within less than four miles of places of worship, and priests and preachers are as plentiful as candidates to a republican primary in Vermont. (Laughter.) These things are not to be despised by statesmen, because the wisest man that ever lived was King Solomon. I wish he could come back long enough to stop this war. "Righteousness exalteth a nation, but sins are a reproach to any people." And I believe it. We have been getting along pretty well. Those are samples, the muck rakers and pessimists to the contrary notwithstanding. I will tell you one thing I am prouder of than of what I have said. I have never heard any soul mention it in my life. There are many, many people who do not seem to know it. When the Fathers proclaimed this republic at Philadelphia on the Fourth of July, 1776, there was only one other republic on earth, the Republic of Switzerland, and the Fathers were not certain that this would live until Christmas. It was in a very precarious condition. Of course, everything is well that ends well. Everything was in retrospect, but the men who signed that document did it with halters about their necks. Old Ben Franklin, the greatest wit of his time, said, "Now that we have signed this declaration, we must all hang together or we will all hang separately." (Laughter.) General Ben Harrison, grandfather of our General Ben Harrison, was a big, stocky man, who weighed approximately three hundred pounds. In signing the Declaration of Independence he remarked that if they had to hang separately, he would be one of the first on account of his great weight, and would die quicker. (Laughter.) That was the spirit that signed that document. Thanks be to Almighty God that there are twenty-six republics in the world, and from present indications we may have another one soon. We did it not by conquering armies, but by the wholesomeness of our example, by teaching all creation that men can govern themselves.

Mark Twain, the greatest Missourian that ever lived, and the greatest literary American that ever lived (that is what the verdict is going to be), once said, "Blessed is the man who bloweth his own horn, lest it be not blown." (Laughter.) That dictum of the great Missouri philosopher applies to nations as well as to individuals. And we did it. If it had not been for us, not one of these Central South American republics could have lived six months. Some of them could get along now I think, may be, but we gave them a breathing spell. We gave them a chance to live. How much did it cost? Not a red cent. What was it that did it? It was the American people back of an American doctor.

I was very glad indeed to hear Dr. Boynton speak about the dentists getting better and the doctors getting better, and the preachers getting better, and he might have added the editors of newspapers are getting better, and congressmen are getting better. (Applause.)

The American Congress is one of the greatest legislative bodies on the face of the earth. One of the wise things the Fathers did was to divide this government into three branches, legislative, judicial and executive. The second wise thing they did was to divide Congress into two branches. One branch of this somebody doubted sometime. George Washington did not set himself up as a humorist, but some woman asked him one day at a big dinner what they had the Senate for anyhow. "Well," George said, "the Senate fills the same office as a saucer does in receiving tea, they can pour the hot tea into it and let it cool." (Laughter.) Evidently he would not have qualified as an expert at one of these pink tea performances. If any one were to drink tea out of a saucer all these people would have apoplexy, but nevertheless he stated a great truth.

Your Toastmaster has said that I am Speaker of the House of Representatives, and I am the only democrat, living or dead, that was ever nominated unanimously in a democratic congress the first term of the Speakership. All the rest of the speakers had to fight for the office. I have been nominated that way four times, and if I live a few days more I will be nominated again. (Applause.)

The word Speaker, as commonly understood, is a misnomer. It is not the business of the Speaker to make speeches, and from the days of Henry Clay down to my time they hardly ever did. I heard Speaker Crisp make one speech, but never heard Speaker

Reed open his mouth on the floor or Speaker Henderson, and I never heard Uncle Joe Cannon make a speech when he was Speaker until I made it so hot for him that he could not keep his mouth shut when the tariff was under discussion. I was slow in making speeches in the first term, but it is not any considerable part of the business of the presiding officer of the House to make speeches. Why, then, is he called Speaker? Because without rhyme or reason it was copied from the English. Here is what they did. When parliament met the King called the two houses together, and made a speech which somebody had written for him, and in those days parliament fixed a day for the speech and all members marched to see the King, and the presiding officer of the house delivered the speech, and therefore he became speaker.

Our President Wilson comes over to make a speech to Congress occasionally, and some day we are going to make a speech to him in all human probability. One good turn deserves another. (Laughter.) I think he will take it in good heart and in good sense. We do not get mad because he speaks to us on show day. (Laughter.)

They are carrying on a debate now in the Senate both day and night. Ollier James has had his bed moved over there.

I will tell you some things about the two houses. There is no limit in the United States Senate to speech making except human endurance. (Laughter.) I may speak of it as endurance for the man who is making the speech. In the House of Representatives the longest speech you can make is one hour without unanimous consent. I will give you a sample.

In 1894, when the Senate was considering the Wilson bill, Quay of Pennsylvania, who did not set himself up as a speech-maker, but is a wise man and a brilliant scholar, spoke seventy mortal hours on that bill, not all at once. He could not, but he spoke for two or three hours at a time. Over in the Senate he could rest. That was fourteen whole legislative days. Then he fixed himself up another speech out of all the junk he could find in the tariff, had it typewritten, and carried it in a shawl strap about with him, or had it in his desk, ready at any moment to use it whenever an opportunity presented. He did use it. If he had been in the House they could have easily gotten rid of him. The House means business.

When Frederick Augustus Muhlenberg called the first House to order he presided over fifty-six men. I presided over four hundred and thirty-five members, two territorial delegates, three nondescript commissioners from Porto Rico and the Philippines. The first ratio for a congressman was thirty-three thousand people. Now it is two hundred twelve thousand, five hundred. That indicates how we have been growing.

The subject put down on the program is "Humors of the House." The House is a serious-minded body. A great many senators and congressmen use wit and humor as an incident of speech in order to clinch a point or illustrate a proposition. The five first orators were Abraham Lincoln, Tom Corwin, Sunset Cox, Proctor Knott, and John Allen, of Mississippi. The real work of the House of Representatives is serious. It is done by serious men. They worked so much and so hard last summer and fall that they got stupid—all of them—the Speaker included. I cannot talk about all of them, but I will give you two or three samples. They are all my friends.

Oscar Dudley Underwood, democratic floor leader, hardly appreciates a joke any more than George Washington. George Washington once woke up his wife by laughing. She asked him what he was laughing about, and he said he had just seen the point of a joke a man told him at the breakfast table that morning. (Laughter.) Underwood is able, capable, courageous, industrious, effective.

The republican leader of the House lives in this city—James R. Mann. (Applause.) I give it as my opinion that he is the most industrious human being I ever clapped my eyes on. I used to think Roosevelt was, but Mann can give him cards and spades. I am not going to back up republican candidates or any other sort, but if the republicans have real good sense they will nominate Mann for president. That is my judgment. (Applause.) But he would have no show in being elected. That is another question. (Laughter.) He is able, intelligent, honest.

Let us take Dick Murdock, leader of the coterie of bull mooses. He is a fine man, an honest man, a sincere man, a young man, who has already made his mark. These are samples. They are the head ones at the suffrages of their fellows.

I want to ask this intelligent audience a question on the sub-

ject of humor. How does it happen Abraham Lincoln deserves to divide with Mark Twain and Artemus Ward the distinguished honor of being one of the greatest humorists that ever set foot on this continent? He never left any trace whatever of his humor in his congressional career. We can't find it there, and that is where you would expect to find it. It is said he was always joking in the White House to relieve the misery of his heart. I would like to ask, how does it happen that Abraham Lincoln has the reputation of being undoubtedly one of the greatest American statesmen. I have got four favorites among the presidents—Washington, Jefferson, Jackson and Lincoln. I think Lincoln was one of the greatest of the four. How does it happen that he never left in his congressional career any trace whatever of any of the great qualities which made the man immortal? He didn't do it. You cannot find them. True, he was an ordinary congressman, and a great president. I will give you my theory. A congressman did not suit him and he did not fit Congress. It was not the field of his endeavor, and Carlyle was right in that quotation when he said: "Happy is the man who finds the work he is appointed to do." Humor never pays. You have heard that saying time and again. It is said that Tom Corwin, one of the greatest wags, was so humorous that it kept him from being nominated for president. It had nothing to do with it. What kept him from being nominated for president? The thing that kept him from being president was one of the greatest speeches ever delivered by man since the confusion of tongues at Babel—his speech in the United States Senate against the Mexican War, and the American people were in favor of the Mexican War and would have nominated him before he made that speech. Just as the abolitionists were getting troublesome, they were not strong enough to lick anybody, but strong enough to beat somebody. Corwin was running for Congress in southern Ohio. He was just about the color of a mulatto—very dark—so dark that a stage driver not knowing who he was made him ride on the top of the stage instead of riding inside. Well, he was down there making a speech, and some fellow in the audience got up and asked the question, are you in favor of a law permitting colored people to eat with white people in hotels and high class restaurants? He did not say yes or no, but remarked, "Ladies and Gentlemen, I submit, a question of that character ought

not to be asked of a gentleman of my color," and he was elected. To say that humor never pays, I will tell you what I saw John Allen of Mississippi do. I saw him joke the House into such a fine and happy frame of mind that they voted five hundred thousand acres of land in the Delta of Mississippi to endow a female school. I will give you one sentence out of that speech. He said, "Mr. Speaker, that school is maintained for the benefit of a lot of the loveliest female girls that the world ever saw." Who could resist an appeal like that? (Laughter.)

I want to tell you about the power of repartee which involves wit and sarcasm and humor, one of the most valuable equipments for a public speaker. I will give you examples.

One day John J. O'Neill, who was making a speech, and who was more celebrated for the bitterness of his tongue than the quality of his brain, got tired and turned on his tormentor with this exclamation, "If the gall which you have in your heart could be poured into your stomach, you would die instantly of black vomit." (Laughter.) That was the end of that man temporarily.

A United States Senator from Chicago, Colonel James Hamilton Lewis, a brilliant man, quite apt at repartee, got up one day and indulged in a rapid fire debate with Quig of New York. The subject under discussion was trusts. Lewis made a stab at trusts, with Quig defending them. After a while Quig made a slight lunge at Lewis, when Lewis drew back about ten or fifteen steps, made four or five bows, and said, "Mr. Speaker, I do not wonder that the gentleman from New York defends trusts because it is written in a very old book that 'The ox knoweth his owner and the ass his master's crib.'" (Laughter.) That was the last of Quig.

Some people think Speaker Reed was witty and humorous. He was not either. He was sarcastic. His fame rests on two things: the quorum and his sarcasm. One day, in debating with Judge Springer, of Illinois, Judge Springer said: "I would rather be right than be president of the United States." Reed retorted, "Yes, but the trouble is you will never be either." (Laughter.) I will tell you what the trouble about a trust is that nobody can define the thing. So Reed took a turn at defining it. Here is his definition: "A trust is a very small body of very rich men and entirely surrounded by water." (Laughter.)

Many of you doubtless know that the portraits of all speakers are in the Speaker's Lobby, except mine, which will be there later. A great painter painted the portrait of Reed, so they say. After it was put up, Reed one day looked at it a minute or two, and then said, "All my enemies are avenged." (Laughter.)

For years and years the Chaplains of both House and Senate were blind as bats. We have got a blind Chaplain yet, but our blind Chaplain knows enough to pray short prayers. He understands the spiritual taste, if not the spiritual wants of his audience. Once in a while a visiting brother prays for us and goes into things more *in extenso*. One morning, just after the Spanish-American War, a young Army Chaplain prayed and prayed, and at last wound up by praying that he wished Reed would govern the House according to the will of God. A Southern man standing close to me said, "That was the most preposterous petition ever uttered at the Throne of Grace." (Laughter.)

It is a great thing to sit and study four hundred and thirty-five men and try to find out what they are good for. Sometimes they are witty and sometimes they are humorous, and sometimes they are stupid.

To go back to Tom Corwin. In his old age he made a speech to a law school and said: "Young men, if you want to make a reputation for wisdom, be solemn, solemn as an owl. All monuments in this world are erected to men who are solemn as owls." (Applause.)

Another thing. The newspapers, if they have nothing to do, praise Congress, but sometimes they underrate it. When people get mad at Congress and cannot find anything specific to say about Congress, they lump the members together and characterize them as ignoramuses. That is easy, but it is not true.

Among the most universal scholars I have seen in that House or out of it was Everett, of Massachusetts, son of Everett, candidate for vice president in 1860 on the Union ticket to stave off the inevitable. To show you what kind of men get in there, I will say it is not generally known, it is almost universally forgotten, that Edward Everett was a distinguished minister of the gospel before he became a politician or statesman. Reed said the difference between a statesman and politician was that a statesman is a politician who is dead, but whether Everett was a politician or

statesman, he was a distinguished minister of the gospel before he got into politics, and whether as a member of the Legislature of Massachusetts, the Governor of that State, or Representative, Senator, or Foreign Minister, he did nothing incompatible with the highest standard of Christian conduct. I have served with several preachers and they behave as well as the rest of us do. (Laughter.) Dr. Everett told me an incident about his father I never heard before. He said when the Greeks rebelled against the Turks in 1823, they first thought of establishing a republic over there, a Greek republic, and they offered his father the presidency of the Greek republic. That meant a constitutional monarchy, and he declined and said to his friends that rather than receive any gift or office from any foreign king, prince, potentate or country, if needs be, he would rather work as a hod carrier or a deck hand on some boat and remain a plain American citizen. (Applause.)

If I had time, I could give you thousands of illustrations of the wit and humor of Congress.

Finally, let me say to you, it is a serious body. It is an honest body. It is a courageous body. It is a patriotic body. It is a body that serves its country faithfully and well, and deserves credit which it does not sometimes get, and I am proud of being at the head of such a body as that, and you ought to be proud of it. I thank you for your kindness. (Loud applause.)

DEDICATION OF THE THOMAS W. EVANS MUSEUM
AND DENTAL INSTITUTE, SCHOOL OF DENTISTRY,
UNIVERSITY OF PENNSYLVANIA.

On February 22nd, 1915, the new Evans Dental Institute in Philadelphia was opened with impressive ceremonies. In addition to the regular dedication addresses, the University took occasion to confer honorary degrees upon various eminent men in different parts of the world.

The honorary degree of Doctor of Laws was conferred on Dean Edward C. Kirk and Dr. Edwin T. Darby; the degree of Master of Science in Architecture on John T. Windrim, and upon the following eight men the degree of Doctor of Science: William Simon, Truman William Brophy, Edward Hartley Angle, Eugene

Solomon Talbot, John Howard Mummery, Edouard Charles Godon, Wilhelm Dieck and Greene Vardiman Black.

The Institute building is in the Tudor style of architecture which prevailed in the time of Henry VIII and might be described as Collegiate Gothic, being in keeping with other late buildings, constructed of Indiana limestone and hard-burnt brick. It was designed by John T. Windrim. Ground was broken on September 24, 1912, and the corner-stone laid on May 3, 1913. The building has a frontage on Spruce Street of 242 feet, and a depth to Irving Street along Fortieth Street of 161 feet. It is built in the form of the letter H and has three stories over a high basement. The benefaction of Dr. Evans includes this building with its equipment and a substantial endowment fund.

Among the interesting features of the building are the square tower and the Evans Museum. The tower, which is at the main entrance at the center of the Spruce Street wing, is thirty-eight feet square, rising to eighty-four feet. In the center of the tower, beginning at the second story and reaching almost to the top of the third floor, is a large window, which lights the library on the second floor.

The Evans Museum occupies the east half of the Spruce Street wing, and is as nearly fire and burglar proof as modern science can make it. This houses the priceless Evans collection.

In the west end of the Spruce Street wing are the offices of the Dean of the Institution, and the Board-room. The rest of the ground floor is divided into class-rooms and laboratories, the entire north wing being devoted to this purpose. To the right and left of the monumental hallway, which extends from the roof to the first floor, are rooms for various phases of clinical dental service, radiography, photography, instructors' rooms, etc., and a model dental office.

Another of the imposing features of the building is the large operative clinic hall in the north wing on the second floor. Altogether it is worthy the generous donor, and the best traditions of the University with which it is affiliated.

THE LATE THOMAS W. EVANS.

Thomas W. Evans, the founder of the Thomas W. Evans Institute, was born in Philadelphia, December 23, 1823, and died in Paris, France, on November 14, 1897, shortly after his return

to Europe after a brief visit to America. As a boy he lived with his parents in the house which stood on the lot at the northwest corner of Fortieth and Spruce Streets, where the new building now stands as a permanent monument to the great American dental surgeon. He was the youngest of three sons, Rudolph, Theodore, and Thomas, the subject of this sketch. He was educated in the common schools of Philadelphia, and at the age of fourteen entered the employ of Joseph Warner,



The academic procession coming through the dormitory quadrangle on its way to the Evans Institute Building.

a gold and silversmith of Philadelphia, whose business included the manufacture of certain surgical instruments, and incidentally of plate, solders, and some of the implements used by dentists. His apprenticeship with Warner brought him into occasional contact with dentists of that period and their methods, and in that way he no doubt derived the impetus which led him later to enter upon the study of dentistry as a profession. In 1841 he became a student in the office of the late Dr. John DeHaven White, of Philadelphia, with whom he remained for two years. During his

studies with Dr. White he attended lectures at Jefferson Medical College, from which, in due course, he was graduated.

He practiced his profession for a time in Maryland, and later, in partnership with Dr. Philip Van Patten, at Lancaster, Pa., with whom he remained until 1847. It was during his stay in Lancaster that Dr. Evans performed a series of gold contour filling operations which he exhibited at the annual exhibition held under the auspices of the Franklin Institute in the fall of 1847, and for



South Facade Evans Institute.

which he received a gold medal in recognition of the novelty and merit of his work. Dr. C. Starr Brewster, an American dentist practicing in Paris, had his attention called to this work done by Dr. Evans, and was so impressed by it that a partnership was arranged between them.

The partnership between Drs. Brewster and Evans lasted until 1850, during which year Dr. Evans opened an office on his own account in the Rue de la Paix, and entered upon a professional career, which was as wonderful as it was unique.

Although Dr. Evans was not the pioneer American dentist

in Europe, he brought to Europe a combination of personal characteristics and special technical ability which not only made him a conspicuous figure, but gave an impetus to dental practice and a status to its representatives before unknown.

Dr. Evans as an operator may have had many peers, and in recent years many who excelled him as a practitioner. There are not wanting those who place but light estimate upon his abilities as a dentist, and who attribute his phenomenal success to abilities



View of the audience at the dedicatory exercises.

quite apart from his skill as an operator. There is, however, evidence tending to show that he was an operator of more than usual ability.

His professional equipment in itself cannot be regarded as the cause of his phenomenal success. His abilities as a practitioner were merely a contributing factor in a complexus of characteristics which have helped to make Dr. Evans the most conspicuous figure connected with dentistry. Dentistry became to him the stepping-stone which served as a means of bringing him into contact with those to whom he made himself of value and who contributed

substantially to his success. He was a born diplomat, possessing a keen perceptive faculty which enabled him to read and correctly understand human nature, delicacy and firmness in his treatment of affairs, a rigid honesty of purpose, and a foresight which was intuitive. In short, he knew how to make the best of his opportunities, and in some degree create them. His association with Dr. Brewster brought him into contact with the aristocratic element of French society; it was his avowed ambition to secure for his clientele all of the crowned heads of Europe, and it has been asserted that in this he succeeded. By his skill and attractive personality he drew them to him and won their confidence. His confidential relationship with Napoleon III has become historical, and its two most important results—namely, the diplomatic mission intrusted to him by Napoleon to President Lincoln during the war of the rebellion, which resulted in the neutrality of France with respect to that issue, and the aid rendered by him to the Empress Eugenie in her escape to England during the riots following the fall of Sedan at the close of the Franco-Prussian war—are matters of common knowledge.

It has been stated that Dr. Evans owed his fortune to the patronage shown him by Napoleon III. This is not wholly true. It is a fact that the doctor's reputation was greatly enhanced by the confidence of the French Emperor, and that his list of patrons was greatly enlarged as a result, but by far the greater portion of his accumulated wealth was due to the real estate investments made possible through the personal friendship of the Emperor.

Much of Dr. Evans' life was devoted to works of charity and philanthropy. He rendered important service during the Crimean and Franco-Prussian wars in the care of wounded soldiers, and in introducing more sanitary and humane methods in military hospitals. Sent by the Emperor at his own suggestion during the Crimean war, to study the sanitary condition of European camps and hospitals, he was so impressed by the pictures of misery and suffering there presented to him that on his return he secured the interest of the civilized world in important measures of reform. His record during the late Civil War in the United States will be found in the history of the United States Sanitary Commission, which he organized in Philadelphia, coming over especially to serve his native land in the hour of need. During the Franco-Prussian war he was probably the only man in Europe who might pass from

camp to camp. During all this memorable campaign he personally directed the movements of the ambulance corps of the Red Cross Society.

It was the elements of character which led him to undertake such work and the associations which it made for him that more than all else contributed to his reputation and material success. Throughout his whole career he never forgot, and indeed constantly emphasized, two facts: that he was an American; and that he was a dentist. In his loyalty to his profession he was steadfast; his faith in its possibilities was unflinching; he was always the champion of high professional ideals. The principles which animated his professional life he manifested from the beginning of his work, and were in marked contrast with those of many of his early confreres. In a communication written soon after he located in Paris, he said: "I may have but little to impart, yet that little is at the service of each and all members of my profession; and gladly would I hail the day that should make all that is sound in science and valuable in art common property. . . . By the discussion of subjects connected with our profession and by the contribution of each according to his ability, by the comparison of the different modes of practice, and the making known all new discoveries and improvements, we shall place the profession on more commanding ground, and better serve the generation in which we live."

That his professional life was lived in harmony with these principles the results show. The measure of success which he attained was not limited to material acquisitions, but was extended to the elevating influence which he exerted upon the general status of his profession. He lived to see his chosen calling placed upon more commanding ground, and the value of its ministrations to his generation substantially recognized.

That his life-work was a large contributing factor to that end cannot be doubted, and when all of the factors which have helped in the advancement of the professional status of dentistry are fairly estimated, the influence of the life of Thomas W. Evans will be among the greatest.

On another page in this issue we take pleasure in publishing an address by Dr. Edward C. Kirk on "The Evolution of Dentistry," which was prepared for this occasion and which appeared in *Old Penn*, the University publication, February 27, 1915.

ODONTOLOGICAL SOCIETY OF CHICAGO.

A regular meeting was held February 2, 1915, with the President, Dr. E. A. Royce, in the Chair.

Dr. J. H. Woolley read a paper entitled "The Voice in Its Relation to Artificial Teeth."

DISCUSSION.

DR. F. E. ROACH:

I hardly know how to discuss this paper. I realize that there is something in what Dr. Woolley has put into his paper. It shows he has studied the philosophy of the articulation of speech and its correction or the maintenance of the proper articulation of speech by the proper construction of artificial dentures.

Those of us who have had any experience in the making of artificial dentures know that we almost invariably have some interference with the articulation of speech in most patients. That is not only true of full dentures, but it is true of partial dentures, and when I say partial dentures I mean partial artificial restorations of all kinds. Even in individual crowns we find that the malformation or the construction of an artificial crown or even a filling, or even the artificial restoration of a single tooth by means of an inlay or filling may interfere with the articulation of speech in some people's mouths. It is not always due either to a lack of proper anatomical conformation in the construction of these pieces. The very fact that we make some change from the conditions that the patient is accustomed to in the mouth, and the fact that it is something new, the patient becomes conscious of this new appliance, and therefore the fact that they are conscious of it brings about a decided interference at times with the articulation of speech.

As an illustration, just recently I placed on the lower third molar a crown in place of a tooth that was malformed, conical in form, and believing that in the restoration of this tooth by means of a gold crown I could restore that tooth to what I thought to be the proper anatomical form, giving to it the proper contour for the protection of the gum, which was evidently needed, that patient complained for some little time of that lower third molar interfering with his speech. When it comes to the construction or making of artificial dentures, where we

supply a complete set of teeth, a considerable problem confronts us, if we are going to make these teeth so they do not interfere with the articulation of speech, but will make it possible for our patients to speak and sing naturally, for in the construction of artificial dentures we all see the necessity of supplying not only the teeth themselves, but we must supply a means of support for them, a means of carrying the teeth and holding them in place. An error that is most commonly made in the construction of artificial dentures today is the absence of the lingual contour of the teeth. The teeth that we have today for artificial dentures, most of them, are so formed that there is but little of the natural lingual conformation of the teeth in the completed denture. To my mind this is one of the most serious defects in our artificial denture construction today.

I have been very much interested in a series of articles running in *The Cosmos* recently by a Scotchman named Girdwood. He advocates the use of procelain blocks and tube teeth in all kinds of ways, but he makes the point in the use of these teeth that by grinding and shaping he is able to produce a better lingual contour which allows more room for the tongue and as a consequence a comfortable feeling with less interference with the speech. We do not pay enough attention to this feature in conjunction with all of our artificial restorations, our fixed bridge work, our partial dentures, and removable appliances of all kinds.

DR. CASE :

State why they have such perfect coaptation with the tongue and teeth.

DR. ROACH :

To my mind, I think we are overlooking that feature in our construction, and I think possibly Dr. Case can tell us better just why that is necessary. It is necessary for the reason that nature evidently produced those forms, and the nearer we can conform to nature in the artificial reproduction, the more likelihood we have of securing the best articulation of speech. This has reference to the tongue and the contact of the tongue in producing the various sounds, the actual philosophy of which I am not prepared to fully describe, but I do know from practical experience with these things that this is true; that the most

important feature that I can see in the construcion of all forms of arificial appliances is to produce this lingual conformation of the tooth, and of late years I have been making all my fixed bridge work, almost all of it wherever possible, with a view to carrying the lingual surfaces of the dummies down to the gum and in that way have the dummy occupy the same space that would be occupied by the natural tooth. I find this form of bridge interferes less with the speech than the so-called self-cleansing bridge, is more sanitary and in every way superior.

DR. C. N. JOHNSON :

It is fortunate that such subjects as this are brought before us for consideration at times. We, as a profession, get into the habit of looking at the mechanical construction of our work that is based on restoration, whether partial or full dentures, and in Dr. Woolley's paper I was impressed with this fact that the people are very adaptable to new conditions; if they were not, they would not be able to articulate at all with the average denture that is placed in the mouth. The lingual surfaces of the average denture, upper and lower, particularly the upper, do not in any measure conform to the natural contour of the teeth when the natural ones were in place. The individual who wears an upper denture must of necessity adapt himself to an entirely new condition in order to articulate. The fact that many of them do and can articulate very acceptably is an illustration of the adaptability of human nature; yet I believe that we as dentists in inserting artificial teeth should have a keen perception of the possibilities of helping our patients more than we do by instructing them according to the ideas laid down by Dr. Woolley.

One thing I have been very much impressed with is this, that in the natural tissue of the roof of the mouth we find a different condition from what we reproduce in artificial dentures. We do not ordinarily reproduce the rugae. Those are placed there for a definite function, and the individual who has been accustomed to speaking with the rugae in place and with the lingual surfaces of the teeth against which the tongue may play, is condemned, and I use that term advisedly, to wearing an artificial denture the roof of which is absolutely smooth to the lingual surfaces of the teeth and the patient must be greatly

handicapped in proper enunciation. Some of our very best dentists overlook this, and some of our best public speakers overlook it. I can recall listening to a noted actor who was wearing artificial teeth that did not fit, and they placed him at a great disadvantage in articulation. It was evident there was something wrong with that actor, and I happened to know as a dentist what was wrong with him, and it nearly spoiled a beautiful play. The dental profession in that case was at fault. He may have had a difficult mouth to fit, but he might have been fitted much better than he was, and might have been provided with a surface at the roof of the mouth that would enable him to enunciate better than he did. He talked all the time as if his mouth was filled with mush. I was very much impressed in listening to that play after having heard this same actor years before when he had his natural teeth. Even these were not perfect, but the difference in his enunciation from the first time I heard him to the last time was so marked that it almost took away the enjoyment of the play.

I feel it is a good thing that Dr. Woolley has brought this subject before us for consideration. We are all inclined to think only of the mechanical perfection of our work; that we want a piece of artificial work polished beautifully, and we want it smooth. We want it to look like jewelry, but the fact of the matter is we should strive to give our patients something as near the natural condition as possible, and we can do it very much better than we have been doing.

DR. C. S. CASE:

This is a subject in which I have been interested for many years, and I have spent many hours of study and investigation upon the mechanism of speech. First as a practitioner of prosthetic dentistry with an endeavor to attain not only use and beauty, but to place the teeth in such relation to the activities of the tongue and the necessary movements of the lips, so that patients would be able to articulate perfectly. Second, in the practice of orthodontia to regulate the teeth and the jaws in such a manner not only to attain perfect occlusion and facial effect, but to aid the attainment of perfect speech. Third, in the correction of speech of cleft palate patients by the construction of artificial palates, and the teaching of patients how to

talk after these palates were placed in position. In my practice in this department I have not only studied the mechanism of speech for my own benefit, but for the benefit of my patients. After the artificial palates are in place, I teach patients the positions of the tongue, and the lips, how to enunciate and utter the different oral elements of speech. When I have finished with them, I make drawings of the position of the tongue for the parts of speech in which they fail to properly utter.

I am intensely interested at the present time in this subject because I am writing a treatise on the correction of speech for cleft palate patients, which will pertain not only to the construction of artificial palates, but methods to be employed by operators who undertake these operations in instructing their patients how to talk.

Some of the things in Dr. Woolley's paper interested me very much. We have all noticed that artificial dentures have changed the voice. It reminds me of an incident which happened in my early practice when I attempted to put in plumpers for patients. The plumpers increased the size of the oral cavity in such a way that it was impossible for the muscles to close the buccal spaces in enunciating certain sounds, in which this is necessary and to prevent a hollow and very unnatural sound to the voice.

I was pleased to hear Dr. Roach speak of the influence which the lingual surfaces of the buccal teeth might have upon speech. In a large proportion of the consonants, "the tongue must make a perfect occlusion or coaptation with the borders of the teeth and the gums in order to stop the air, and accumulate it back of the stops to perfectly enunciate explosives and aspirates. If there is any opening through which air can escape into the buccal cavities" along the lines of the teeth this will be impossible.

It seems to me, in order to perfectly understand what we are trying to get at, it is necessary to know what are really vowels and consonants and how they are mechanically made.

As to the difference between the consonants and the vowels, the essayist says: "An English dentist says that vowel sounds depend upon the relation of the size of the oral cavity to the size of the arch," and his definition of consonants seems quite as vague. Any one who speaks perfectly does not require to be told how the oral elements of vowel and consonant sounds are

made and what the positions of the tongue are, because everybody who speaks distinctly makes the same sounds exactly alike, or nearly so. With a very little thought and close observation they can tell where the tongue is placed, and what is the position of the mouth and lips. The reason why they are called vowels is because they are the voice sounds of language, and the consonants are the forcible breath sounds of language, which give to it its distinct enunciatory quality.

I have advocated that all dentists and oral surgeons who attempt to correct cleft palates, should themselves be well informed in regard to how their patients should be instructed to talk. I have made quite a feature of this, as I think it lies at the foundation of the correction of speech after operations. Nearly all cleft palate patients, before receiving aid, will make all the vowel sounds quite distinctly, but fail on the consonants,—the explosives and aspirates—which they commonly make in the throat when they make them at all. The sibilant sound is such an important element of correct articulation when made at the tip end of the tongue with a thin high whistle, and as it requires but slight pressure of air it is naturally the first lesson given to patients. I take that up with patients before I have attempted to do anything else, and I am surprised to find how many can be taught to make this and many articulate sounds which they never have made distinctly, even before they have the artificial palate. The reason is, their parents and teachers have never attempted to give them any instruction in regard to the positions of the tongue, etc., believing it to be impossible for them to articulate or speak any more perfectly without some kind of operation, and because their condition is a delicate question in the family.

In speaking of the mechanism of speech in the work I am about to publish, I say: The frame work of the speech-making machine is the thorax, the trachea, the pharynx, the oral and nasal cavities, the jaws, the dentures, and the roof of the mouth. The active or mobile parts of this machine are the diaphragm, the intercostal muscles, the vocal cords, the pharyngeal, palatal, lingual, labial, and buccinator muscles. To these may be added the hyoid and masseter muscles which aid in regulating the oral cavity in opening and closing the jaws. The action of this co-

ordinated machinery, which is fed with expirations of air from the lungs, and whose product is spoken language, is worthy of the deepest study of dentists, whose every department of applied science is concerned in perfecting or marring its mechanism.

The sensations which we cognize as sounds of every character reach the brain through the auditory apparatus which is thrown into functional activity usually by vibratory wave movements of air. A somewhat prolonged and forcible expiration of breath from the lungs throws into vibrations the vocal cords of the larynx, which in turn impart their vibrations to the air, giving rise to the sound we call voice. Its quality, pitch and loudness are regulated by the character of the tissues which compose the cords, their tension, and the force of the air blasts, all of which is fully described in works on phonology and orthoepy.

As the voice leaves the larynx and travels upward toward the mouth as sound or a combination of tones, it comes under the influence of certain definite muscular movements and restrictions which stop or interrupt its free passage, or force it into certain chambers or channels of different forms, by which it is moulded into speech or vocal language. Therefore to speak distinctly there are certain physical requirements which must be fulfilled. Among the foremost of these is the necessity to completely close the palato-pharyngeal passage so that in most parts of speech not a particle of the expired breath used in talking can escape into the nose, because otherwise—as will be shown—it is impossible to properly and distinctly enunciate all vowel and nearly all consonant utterances.

This closure of the nasal passage is accomplished under normal conditions with the velum palati and pharyngeal muscles. The object of it is two-fold: First, for the distinct enunciation of all consonants, except in syllables containing *m*, *n*, and *ng*, the breath must be forced with considerable pressure at times against full stops in the mouth or at the lips, so that the required sound may be suddenly emitted as an explosive: boy, toy, etc. At other times it must be forced with almost equal pressure through restricted passages to increase its velocity in the utterance of aspirates: so, she, etc. It would be impossible to obtain this required pressure if a part of the air escaped into the nose, as might occur with a cleft palate or an imperfect

artificial or surgically corrected palate. Second, while the vibratory breath of vowel utterances is not materially obstructed in its passage through the mouth, perfect vocal tone and resonance of speech is impossible if even a small part of it is permitted to pass into the nose during their utterances.

It is a mistaken idea, especially among teachers of vocal music, that a part of the original vibrating air of voice passes into the chambers of the head in order to produce desired resonating quality. The quality of voice which we know as *resonance*, and which is quite as important to perfect speech and vocal music as distinct articulation, no doubt starts to be imparted to the voice in the trachea and continues to characterize the quality of tone by different forms of the pharyngeal and oral channels through which it passes, in the mechanism of speech. But this is only a part of the resonating quality of speech, as voice vibrations are readily imparted to the surrounding tissue media, and thus transmitted to the real "sounding board" of the head, whose resonating chambers may at the time be *completely shut off from the air below the palate*, whose main requirements for distinct articulation would otherwise be aborted. A person outside of an hermetically sealed door can be distinctly understood by one on the inside if he speaks loud enough, and yet not a particle of the vibratory air of the voice, *per se*, penetrates the door. What does occur; the substance of which the door is composed is thrown into voice vibrations which in turn are imparted to the air on the inside and thus reaches the ear as spoken language.

It will be seen that the velum palati in the normal state is not only the chief organ which permits and aids distinct articulation by completely closing the palato-pharyngeal passage, but it also, when stretched out to a thin drum like tensity in the performance of this function is an admirable transmitter of voice vibrations which gives to speech its main resonating quality. In fact pure resonance and clear vocal tone quality of all vowel utterances of the English language seem to require this closure—a thing which cannot be said of the French and possibly many other languages. In speaking any of our vowels with a forcible guttural prolongation, we can distinctly feel the vibration of the throat tissues, which plainly indicates the functional mechanism by which the voice readily passes through a

closed palate in nearly all requirements of speech, and not back of an open palate. If we utter the same vowels with the palate open, a marked nasal quality is the result.

It is only through an understanding of the functions of the velum palati that we gain a true conception of its indispensable action in the mechanism of speech, and are able to fully realize the object and difficulties of an operation which contemplates the restoration of a cleft palate by surgical or artificial means. It forms also an important foundation for an intelligent comprehension of the art of speaking correctly.

"The exact quality and character of each *oral element* is determined by the requisite position and relation of the several organs of speech. Correct enunciation depends primarily on correct position of these organs; it is therefore of vital importance that the teacher should, in the first place, know what the *correct sounds are*, to the ear, and, in the second place what the correct positions of the oral organs are, for producing the exact sound required. When the teacher finds in the pupil a wrong habit of sound production, the first point of attack should be the securing of a correct sound image; the next should be the securing of the proper position of the organs for producing that sound."* When a word or syllable is found to be imperfectly articulated it should be at once divided into its oral elements and the pupil required to practice upon the isolated elementary sound or sounds in which they fail, until they become proficient in that part, before they attempt to pronounce the whole word.

The alphabetical symbols which stand for the oral elements of speech in the English language are divided into vowels and consonants. An *oral element* or elementary sound is one which is uttered with a single impulse, always with the same mechanism and that cannot be divided into separate sounds. It may be composed of one or more letters. For instance in the word "cat," there are three oral elements: whose phonism may be represented to the eye as ka-a-t, whereas in, "ought," a word of five letters, there are only two oral elements, au-ta.

In pronouncing the names of the letters which stand for the vowel elements—a, e, i, etc.—we find that they compare favorably with the elementary sounds of these letters in speak-

* Albert Sailsbury, Ph.D. "Phonology and Orthoepey."

ing the words in which they occur—except in diphthongs and silent letters—because the utterance of any of the vowels is an elementary emission similar to their phonetic sounds.

In this particular they differ quite decidedly from the consonants, each one of which requires a vowel in its pronunciation, and in the spelling of its name, as, be, de, te, etc. Therefore in speaking the names of the consonants we are not uttering the oral elements alone which they stand for in speech, but two or more oral elements, as, ba-e, a sudden short explosive sound, ba or be, which is the real element which the symbol stands for, in boy, bet, etc., and a vowel element e. Otherwise they would have no character if uttered alone as do the vowels. Furthermore, the spoken name of many of the consonants is almost nothing like the oral element which the consonant symbol stands for in speech. For instance, "h," phonetically is composed of two oral elements, a and ch, but its oral element in the words horse, house, etc., is an open aspirate, which is a forced breath sound made at the back of the mouth or in the throat, and which should not be confounded with the vocalized vowel element which always follows and gives character to it. Again the letter w pronounced is seen to be composed of four elements: da-ba-l-u, but, like "h," no one of them are at all like the open aspirate element made at the lips in *avho*, when, etc.

Broadly speaking, the vowels are the body or frame-work of speech, and the consonants are the finishing touches which give to speech its sharply defined characteristics. The vowels are the open voice sounds, and the consonants are the forced breath sounds; and while the latter are frequently vocalized, their main function is to give distinct enunciatory quality. In order to understand the composition and mechanism of the oral elements of speech, a clear conception of the distinctive parts of speech which enter into their formation, together with the distinctive characters of the physiological movements and positions they require is of imperative importance.

DR. J. E. HINKINS:

I have enjoyed the paper of Dr. Woolley, although I shall not attempt to discuss it, but simply relate a case that came under my observation some years ago. It was the first time that my attention was ever called to the importance of sounds in connec-

tion with artificial teeth. The patient, a lady, was a singer of some note who by accident lost most of her teeth, and I had to place a full denture for her. In the first denture I made I paid no attention to sound, but made the denture purely for the purpose of aiding mastication and its appearance from an artistic standpoint. It was a temporary denture, and while she got along very well in eating and so far as appearance went, when she sang she had lost all the tones she had in the voice before. After she had worn it for a month I attempted to make another denture with which she could sing. I took an impression and put it upon base plate, adjusted the teeth as well as I could, and added wax, and spent a good deal of time until finally I got to the stage where she could sing pretty well. The teeth were finished up. While she could sing with this denture, she could not eat so well, and her appearance was not so good. Shortly after that my attention was directed to Dr. Woolley's first paper, and after reading it carefully I made her a set of teeth with which she managed to get along fairly well from all points of view.

DR. J. G. REID:

I have been much interested in this subject because it is new to me. However, its importance was impressed upon me by a barn-storm actress who by accident lost some of her teeth while in this city, and some one sent her to me to try and do something for her. She had a partial artificial denture in her mouth, and when she came in she said, "Doctor, I am very particular about having this made. Can you do it?" I replied, "I do not know; I have never tried, but I will try." "Well," she said, "I can tell you what I want done. I can nearly make one myself. I have had so many of these made in my lifetime that I have learned the system of making them and I can help you out in making this particular denture for me." Her suggestions were valuable in this particular case, because she was able to do what she said. I made a skeleton plate for her, and she said, "If you will give me some wax I can put what I want on that plate." She did it herself. The plate was made out of ideal base plate. She took a yellow piece of wax and worked it with her finger just as though she knew how to handle it. She tore off a little piece here, and put a little piece there, and made the plate outside of the mouth before putting it in practically, and then inserted it into her mouth. "Now," she said, "when I get

that in there, it will be practically what I want," and when it was done she took it out of her mouth, took a knife that I had and began to scrape off the wax here and there. She made that plate, fitted it exactly as she wanted it in her mouth. Further, she said, "You may think I am foolish about this, but I have to do some singing and it is necessary to have this plate as perfect as possible or I cannot sing." This was very interesting to me because it was novel and new, and it taught me some things about the importance of this work. When the plate was finished I wanted to get some teeth, and she said that she would select the kind of teeth she wanted. I went over to the dental depot and got about forty sets of teeth of various shapes and sizes, such as I could get out of a miscellaneous lot. That woman picked out a set of teeth the first crack out of the box. It did not take her five minutes to make the selection. I got the form she wanted, but the color was not suitable, and I was able to find a suitable color. I set these teeth up on that plate, she waxed the teeth to the plate, and put the plate in her mouth. When I got through and everything was waxed properly she said to me, "If you will vulcanize that plate it will be satisfactory to me, and I will be able to use it as I want to." And I did. She went out of the office perfectly satisfied.

People who depend upon appearing before the public as speakers and singers appreciate the importance of what they want. They think about these things, and if they go to a dentist they expect him to help them out. Someone had taught her prior to this time, the one who made her a plate, and she had this same thing in view, and that is what gave her the idea of having the plate made in a certain way, giving her the cue as to the making of the plate.

I have related this case to show the importance of making partial or full dentures in such a way as to interfere as little as possible with articulation and enunciation.

The paper of Dr. Woolley has been exceedingly interesting to me, and particularly the remarks of Dr. Case. What both have said is worthy of the greatest consideration, and I am sure great good is going to come out of it.

DR. TRUMAN W. BROPHY:

I have been greatly pleased with the effort Dr. Woolley has

made, and I am satisfied the work he is doing in this direction is going to be of great value.

Considering the question of artificial dentures and voice culture, I often wonder why or how people who wear artificial dentures talk as well as they do. The natural tooth has a length three or four times greater on the lingual surface than have artificial ones. In the first place, we will take a tooth that seems to be quite as long on the labial surface, and then if we examine it on the lingual surface we see the pins coming out there, and then if the denture happens to be rubber, a great thickness of rubber is placed in contact with the lingual surface, leaving only a short tooth. I think it is within bounds to say the length of that tooth on the lingual surface is not more than one-quarter of the length of a natural tooth. This interferes with the position of the tongue in uttering certain sounds, and the voice must necessarily be very greatly interfered with.

As to the question of intonation and modulation, we know that within certain districts of our country many acquire a manner of speaking which is characteristic of the people of that section. For instance, if we go into Vermont and meet with people there pretty generally we will find them with high pitched voices. Few indeed have voices with the same kind of intonation that we have and that most people have in our section of the country. They speak with a nasal tone, and that nasal tone is inherited the same as the dialect of the people of the south, who speak in a manner peculiar to themselves. We all know a southern person by the manner of speech and the intonation of voice. It is a habit. It is inherited, or perhaps acquired by contact with other people. They cannot help speaking that way. Ask a Vermonter to say John and he will do so with a nasal intonation and a high pitched voice.

Regarding the postpharyngeal opening, I agree with Dr. Case that it is a very important matter to secure a palate that has sufficient length, resiliency and flexibility to pass back and close this opening, and yet I have seen persons whose palates were short, who never had any defect within their palates, and yet spoke with just as much perfection and distinctness as anyone.

Some years ago, when I was filling the teeth of a certain man, I noticed he had a short palate, and I asked him if he would allow me to make a careful examination of it and study it in connection

with the use of different sounds. It was impossible for him to bring his palate in contact with the postpharyngeal wall, and yet he spoke distinctly.

DR. CASE:

Were not the pharyngeal muscles developed enough?

DR. BROPHY:

The muscles near the palate could not close the space.

DR. CASE:

Then his nose must have been stopped because you must have a certain force of air to make certain tones.

DR. BROPHY:

His nose was not obstructed.

The trouble with cleft palate patients and the operations that are done upon them is that the operator before he gets the parts united has spoiled the palate by making it too short. If he could get the notion that it does not do to make that sort of operation, but make the palate longer, so as to reach the postpharyngeal wall, he would get a good result.

In regard to the vowels, we know what steam does when it is forced through a pipe. There is a hissing sound. It is hard to get a person to make that sound who has a cleft palate, and yet he can do so if he has a palate long enough and learns how to use the voice and to poise the tongue. The whole question is to make a long flexible palate and then teach the patient how to talk. It is like learning to play the piano. It is possible to produce the most delightful music with it by one who knows how to play, but the man who does not know how to play does not succeed. A patient who has never learned to speak must be taught. He may have the instrument produced by the skill of Dr. Case or by the skill of a successful surgical operation, yet he cannot speak unless he has learned to use his tongue. He must learn mechanically to use these parts, and he never will learn unless he gets before a mirror and learns mechanically how to use his tongue, lips and all the parts which enter into phonation.

Regarding vowels and consonants, there is no such a thing as a pure consonant except in some few instances. The letters that are hard to say are k, t and h. They are the most troublesome ones to pronounce and understand. K is not a pure consonant. What is it? It is a combination of two sounds and one is a vowel

sound. If you mix these two sounds and bring them together you get the letter k, but you must use the vowel with it. You have guttural sounds mixed with the vowel and you have l the same way. You get the short sound of e mixed with the other. You say t and you get the sound t-e. So we have no such thing in these combinations as pure consonants or pure vowels. Then you have the same in h, the long sound of a-ch.

Speaking of singing, one of the most charming singers I ever heard did not have a tooth in his mouth. He sang in grand opera in England and in this country. This patient came to me as a sufferer from neuralgia.

In conclusion, I wish to say that the work Dr. Case has done and is doing by his researches regarding speech and teaching these patients how to speak will doubtless be the crowning effort of his life.

DR. C. S. CASE:

I wish to say in reply to Dr. Brophy that in pronouncing the alphabetical letters, we are not necessarily uttering the same sounds which these letters stand for in words, because they are only the symbols of the oral elements of words. And while it is true that in pronouncing the consonant letters we utter two or more oral elements, it is not true of the vowels. Furthermore the consonant oral elements of speech, unlike the vowels, are quite different from the sounds of the symbols which represent them. The sound of b, in boy, is not be, but it is a short quick breath explosive (ba) that starts and ends at the parting of the lips, which is hardly vocalized before it joins the vowel sound, oy, etc. Again, some of the consonant elements are almost nothing like the name of the letters which stand for them. Take for instance h, whose oral elements are a-ch (ch, as in church), and what is the sound of this letter when we say horse, or house, etc.? It is a breath aspirate, before it takes on the vowel sound. Very unlike the utterance of a-ch, in mechanism and sound. The same is true of w, and other consonants. Therefore, to repeat, the letters and their names, in all languages, are the *symbols* which have been chosen to represent the written and spoken *oral elements* of speech, and while the phonetic sounds of the vowels are those which are uttered in speech it is not so with the consonants, because it requires a vowel to give a consonant oral element character.

DR. L. J. DAVIS:

The topic selected by the essayist is certainly one to which more attention should be given by the average dentist. Judging from what I have seen in the shape of artificial dentures, it seems to me this subject should be hammered into the minds of the general practitioners a little more, so that the dentist should not trust his artificial dentures to the laboratory boy to wax up and fix up before they are shipped back to him, with an immense mass of rubber all over the surface, making a nice, pretty, smooth arch that probably is one-quarter to three-eighths or even half an inch thick in one place, and not less than one-eighth of an inch in any one place, with all the holes filled up and everything done to make a pretty looking plate according to his idea, and one easy to polish. That is a picture of the average laboratory plate. I am thankful to say I was not taught that way, and while I possibly never realized until tonight how much the tongue plays in the proper enunciation, yet my preceptor early in life in my dental work, taught me to try and shape the plate as near as possible to the arch of the patient, so that only one thickness of the ordinary base plate wax was ever laid over the roof of the mouth, and when that was placed on the impression the rugae were reproduced in the thin plate, and the plate polished in that condition. The teeth and ridges built on the side never extended into the palate any more than it was possible. I have continued that work up to the present time, yet never with any realization of the value of it until the matter was brought out by the essayist and by Dr. Case so beautifully and clearly. It is certainly a very important matter, and should receive greater consideration in the future than it has in the past, and if those portions of Dr. Case's remarks which he read from his forthcoming book can be incorporated in this discussion, it would make valuable reading matter for the practicing dentist.

DR. E. A. ROYCE:

I have been very much interested in both the paper and the remarks by Dr. Case. There is such a difference between the natural teeth and the ordinary plate that I often wonder if we realize the difficulties our patients have to overcome in getting used to these imperfect artificial dentures.

Today I received a plate from the laboratory which I consider is a very good piece of work, with the most modern of rugae cuts

on it, etc., etc. I took an impression of a mouth to get the palate and the palatal face of the teeth to compare with the plate and thus see the difference in their make-up. In the plate we have a very short bite, the rubber coming down almost to the occluding face of the bicuspid and molars, making a smooth surface without the natural tooth form, for the tongue to play upon. This plate is made for a patient whose teeth were recently extracted, so we find quite a fullness back of the oral teeth, but it is not as marked as in the cast which was taken with the natural teeth in place. After absorption has taken place, a plate made in the usual way would incline from the tips of the teeth to the roof of the mouth. Instead, it should follow the form of the lingual surfaces of the natural teeth and have the curves and fullness back of the oral teeth which are necessary to give the tongue natural assistance in the formation of correct sounds.

In regard to tube teeth—my objection to those I have seen in use, is that no effort is made to restore the contour of the soft tissues, thus leaving angles and spaces at the neck of the teeth which preclude the possibility of the restoration of voice perfection.

DR. C. S. CASE:

The alveolar ridge back of the front teeth presents a surface that is very important in making a large proportion of our utterances. For instance, all of the anterior linguo-palatals and the sibilant sounds. When you say s, d, t, etc., the tongue goes up against this ridge, and with all explosives there must be a perfect occlusion if the sound is properly enunciated.

DR. WOOLLEY (closing):

I am very glad the suggestions I brought out in my paper have been elaborated so clearly and beautifully by Dr. Case. I have another paper on a kindred subject which I hope some day to present to the society.

My attention was called to this subject while I was in Washington during the Civil War. I had studied elocution from a pupil of an actor by the name of Ned Forrest, also a pupil of Professor Brunson, and being a dentist it suggested to me the necessity of properly prepared artificial dentures with a view to the restoration of the voice to its pure tones, the latter being lost by the edentulous condition of the mouth.

In my next paper my subject will be "Physiognomy and Expression, as Related to Prosthetic Work."

AMERICAN DENTAL SOCIETY OF EUROPE, FORTY-
FIRST ANNUAL MEETING HELD AT PARIS,
FRANCE, JULY 30 TO AUGUST 1, 1914.

DISCUSSION OF THE PAPER BY DR. WILLIAM DUNN, ON "OUR FRIEND
THE BLOOD."

PROFESSOR ARRIGO PIPERNO

Said the members must be very grateful to Dr. Dunn for having emphasized the importance of the blood. When the gums were seen full of blood it was not necessary to jump to the conclusion that it was a terrible disease. The physician did not consider fever to be a disease but an effort of Nature against disease, and the blood in the gum was a great friend, because it was trying to arrest putrefaction. He had been studying the quality of the blood in inflated gums and had come to the conclusion that the blood there had a special reaction to diluted saline solutions; it was much stronger than the blood in circulation and that seemed to signify that Nature was a good friend in producing the inflammation in the gum tissue, as Nature was endeavoring to produce a stronger blood for the purpose of providing against infection.

DR. E. T. DARBY (Philadelphia)

Said he had been exceedingly interested in the paper and there were one or two points that were of special interest. The first was with regard to the action of saliva as a poisonous fluid in wounds. It had been supposed by many that wherever saliva or the germs of the mouth were conveyed to the wound it was a dangerous practice. He remembered some years ago one of the great surgeons in Philadelphia called a dental surgeon to assist him in a brain operation. He used some burs and in changing the instruments the dentist slipped one into his mouth, and the surgeon at once said the instrument had been infected. The dentist told him that he had observed that whenever a dog had an injury he licked the wound and conveyed to it the saliva from the mouth. From time immemorial the saliva of the mouth had been conveyed to the wound caused by the extraction of a tooth and no infection had taken place. The first thought of a child who had wounded itself was to convey the wounded finger to the mouth and saliva was conveyed to the wound. The dangerous effects of saliva in conjunction with wounded surfaces he believed had been over-

estimated; in the majority of instances no infection had been produced. Another point of interest in the paper was the infection by abscesses from impacted third molars. It was not always realized how dangerous an impacted tooth was where suppuration took place. He had known several instances where people had lost their lives from infection incident to an impacted third molar. In his own practice some years ago he was applied to late in the process of an abscess, and on going to the patient's bedside found the patient in a comatose state, and he died the next day. The post mortem showed that it was nothing more or less than an impacted tooth, the infection of which had penetrated to the cervical glands and so into the neck, and before forty-eight hours had passed the patient was covered with bedsores from head to foot and pus exuded all over the body. The suppuration had been transmitted by the blood to the various parts of the body.

PROFESSOR A. CHIAVARO (Rome)

Said there were two theories of the blood—one put forward by Metchnikoff and the other by Ehrlich. One thought the white corpuscles were the main helper and the other the serum. It was better to think that both were of assistance. It was not enough that the white corpuscles and serum had a special mission in defending man against the attacks of the exterior world; they must be kept in a condition to do their work, and for that purpose dentists had an important function to perform. No one had taught the necessity of strengthening the blood and how it could be done better than his beloved friend the father of Dr. Dunn, a dentist who had been working for over sixty years in Florence. Dr. Dunn's advice was not to work hard and to help the white corpuscles and serum to react. Although of a great age, Dr. Dunn took exercise every day and could place himself flat on the floor and raise himself without his hands. Whether by exercise, by golf, or by work, a man should keep himself fit. He himself advocated sleep, and after lunch generally slept for two or three hours and then started work again. While he hoped all dental surgeons would continue to work with zeal, they should at the same time remember that they had the duty of keeping themselves fit.

DR. DAVENPORT (the President)

Said Dr. Dunn always put forward the practical side of his experiments and work. With regard to the angina of Ludwig, it

did not seem to matter how much lancing was done, the case apparently did not benefit. On one occasion he had to treat a very serious case in a man who came with a loose root of a first permanent molar. His glands were swollen very hard and were blue and purple. The molar was removed and common sense showed that the thing to do was to lance very extensively from the floor of the mouth. He took some risks and with a large lancet made an incision at least two inches long in which he put a tampon of cotton soaked in bichlorid of mercury and left it in for some time. A few hours afterwards the conditions were worse and on his advice a surgeon was called in and made an incision of about three inches from underneath opening straight through. The wound was washed constantly with antiseptics and the man lay on his back for six weeks in a fearful condition. Later on he received a beautifully worded letter from the patient thanking him for the part he played in the saving of his life—but he was sorry to say that a few years afterwards the patient had forgotten all about what really had taken place and began to report that he had infected him with a dirty instrument! All such cases should be placed in the hands of a surgeon and he should be advised to lance very thoroughly all the way through.

DR. DUNN

In reply, thanked Professor Chiavaro for the very kind words he had said about his father. It was a privilege to live with Italians who were so sensitive and generous. He had no doubt that the President had saved the life of the patient by lancing early. He agreed with Dr. Chiavaro that sleep was a good thing, but it should be taken, as all Italians took it, with one eye open.

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GOD HELP THE PEOPLE.

We have before in these columns called attention to the possible harm that was likely to come from the indiscriminate extraction of pulpless teeth on insufficient evidence. The hue and cry is being heralded from some quarters that a pulpless tooth is an unsafe tooth, and all the experience of the past half a century is to be thrown to the winds so far as the saving of pulpless teeth is concerned. It matters not that some of our most careful and capable operators have labored hard to establish a rational technique for the management of pulpless teeth, nor that thousands of such teeth have been saved in the past to the great benefit of the people. The dictum has gone forth that all of us have been blinded by our ignorance, and that the people who have been harboring pulpless teeth in their mouths have been dangerously ill all the while and did not know it. From a neighboring State comes the information that some of the dentists are starting a crusade against the retention of pulpless teeth and spreading the gospel of wholesale extraction on X-ray evidence alone. They are reading papers before medical societies and telling physicians that many of the ills which have been baffling them in the past are due wholly to pulpless teeth, and the physicians are believing them. So much so, that these same physicians are beginning to look with suspicion upon any dentist who advocates the retention of pulpless teeth in the mouth of a patient, no matter how perfectly fitted. To what a pretty pass are we coming!

In the language of the late lamented Tillman Joy, "Let's reason the thing a minute." Time and time again has the fact

been emphasized that bad mouth conditions were a menace to the patient, that foci of infection in the gums or sockets of the teeth were likely to spread infection elsewhere. In season and out of season has the dentist claimed that the teeth were of greater importance than the physician thought they were. Always and everywhere has he preached mouth hygiene till he has been termed a fanatic about it. Now has come "the winter of our discontent," and certain dentists and certain physicians have suddenly turned their energies and are clambering over the bounds of reason and sanity in their mad rush to put their finger on a pulpless tooth and condemn it.

The simple facts are these: That while grave injury has undoubtedly been done by the injudicious retention of badly filled and diseased pulpless teeth, and while the profession are open to criticism for the imperfect manner in which many pulpless teeth have been treated, there is no question whatever that most pulpless teeth are amenable to proper treatment and can be made useful, comfortable and safe for the patient, to his very great advantage. Can we not have reform in this matter without fanaticism? Can we not consecrate ourselves to a calm and judicious study of the problem which confronts us so that we may sift the chaff from the wheat and preserve the wheat? Must we throw reason to the winds and run amuck among our patients, sowing havoc wherever we go? No one questions the sincerity or honesty of purpose of the men who are doing this thing. Their intentions are undoubtedly good, but we must not forget that there is a certain very undesirable place which is said to be paved with good intentions.

What is to become of the people from whose mouths useful teeth are being taken? Are they to have bridgework on teeth with pulps alive or are they to be condemned to artificial dentures all their days? Either alternative must be alluring to the thoughtful man. If this panic of extraction is to continue, God help the people.

THE EDITOR'S DESK.

ABROAD IN WAR TIMES.

ANOTHER VACATION STORY.

(Continued from the April issue.)

LONDON. (Continued.)

Our financial difficulties became even greater in London than they had been in Paris. We had arrived in London on a Saturday night, and I had a few British sovereigns in my pocket which I had received from the American Express Company in Paris. Sunday, of course, was a natural holiday, and Monday was a bank holiday. British sovereigns have a faculty of going very rapidly feeding a family of four in war times. The hotels and restaurants did the best they could for us, and I shall never forget our treatment in London. The Hotel Cecil, where we were stopping, would permit us to sign for our meals, but the prices were of necessity exceedingly high. An ordinary luncheon or dinner would cost for my family of four from seven to ten dollars, and as we did not at that time see much prospect of getting out of London we were obliged to economize. Restaurants refused to take paper money at all. Whenever we went into one the head usher would come up as we were being seated and in an apologetic way say: "Sorry, sir; but we are obliged to announce that we cannot accept paper money." The particular restaurant where we ate more frequently than any place happened to be a comparatively new one, and we could not blame them for being careful. It had been running only about two hundred years, and that was very young—for London. It hadn't really got started yet. And this was the first time in seventy years that their prices had been varied in the least. They issued a notice to patrons that they regretted the necessity of raising their prices on account of existing circumstances. I did not blame them, particularly in view of the fact that their prices were exceedingly reasonable.

We were all assured that the financial situation would clear

up when the banks opened Tuesday morning, but to our consternation when Tuesday morning came it was announced that the bank holiday had been extended till the following Friday! I had a single sovereign in my pocket. I was told that the American Express Company was doing its best to care for the people who held its checks, but in view of the crush they could give only twenty dollars to each person. I walked up to the office and saw a double line waiting on the sidewalk nearly a block long. I felt I could do more good some place else than waiting in that line, so I went back to the Cecil.

And now I wish to make an announcement. If any of my readers ever meet Dr. John MacHugh of Philadelphia or Dr. H. E. Hosley of Springfield, Mass., I wish they would step up to them and give them anything they ask for and charge it to me. The reason is this: When Dr. MacHugh learned that I was down to my last sovereign he put his hand in his pocket and pulled out two or three sovereigns and said: "Here, I managed to get hold of these, and you can help yourself." I demurred on the ground that he would probably need them himself. "Never mind," he remarked. "I am here alone and can get along, while you have your family and are in a much more difficult position than I." A man with a heart like that is entitled to a front seat in heaven, and I will gladly get up and give him mine if I happen to get there first. I finally accepted one sovereign from him, and it was the cosiest and most comfortable sovereign I ever had in my pocket. I was fortunately able to pay him back before night, and this is the way it happened: Dr. Hosley had been in Paris and his wife and daughter in Germany when the war threatened. He telegraphed them to meet him in London, and he left Paris a couple of days ahead of me. When I reached London I found that Mrs. Hosley and her daughter had landed safely, through the fortunate circumstance that in Germany they had boarded a Dutch coach on the railway instead of a German coach. At the boundary the Germans did not molest the Dutch coaches, but the German coaches were cut off, and the people left standing on the platform. It was this lucky chance which brought Mrs. Hosley to her husband. When finances became an acute question in London Dr. Hosley took me to one side and said: "Doctor, don't you worry.

I saw this thing coming and got hold of a little gold and silver, which I have in the hotel safe, and I will see that you have enough to pull you through." There is another man who is eligible for a seat in heaven! I don't know whether Dr. Hosley can sing or not, but his voice was the most musical one I ever listened to, and I would pay more to sit down and have a little chat with him this minute than I would to hear a grand opera selection. He cashed sufficient of my traveler's checks to make certain that I could care for my family, and I immediately rose up and called him blessed. Fifty dollars of it was in silver and I gladly carried it around in my pocket. I weighed a ton and felt as if I owned the earth. And all because Dr. Hosley has a heart as big as a load of hay.

That night I chuckled as I started for the restaurant with my family. The head usher began his polite "Sorry, sir, but we are unable to accept paper ——." I headed him off by putting my hand in my pocket, jingling the silver and winking at him. He bowed low, with a broad smile, and he never questioned me afterward when I went in the restaurant. This same chap had been with this restaurant only about fifty years, but he was doing really remarkably well for a beginner and getting quite accustomed to the place. It is astonishing how rapidly some people can adjust themselves to circumstances and conditions.

I played to luck again when it came to securing passage home. I had my tickets back by the "Laurentic" for Montreal, sailing from Liverpool August 29th, but the outlook was very doubtful that she would be permitted to sail, and in any event the pressure of the war situation was growing so tense in England that I was anxious to get my family out as early as possible. As I have already said, the scramble to get passage for America was terrific. On the few ships that were permitted to sail accommodations were at a premium. Millionaires were coming back in steerage and offering all sorts of prices for the privilege. I was determined not to subject my family to steerage accommodations, and resolved to remain quietly in London till the situation cleared in some way. And so far as I was concerned it cleared much sooner than I dared to dream of.

One day I chanced to glance at the hotel register and saw the names "S. S. Davidson, wife and daughter, of Ottawa,

Canada." I could have almost hit the ceiling with a jump! Here was Sam—dear, old Sam—my college mate of former years and one of the choicest spirits in the practice of dentistry. I lay in wait for him, slapped him on the back, saw the same old grin spread over his face, and the world looked brighter from that moment.

"Say," said Sam, after we had chatted a few minutes and nearly forgotten about the war, "how are you and your family going to get home?"

"Sam," I said, "if you can answer that question I will give you credit for even greater insight than you used to display in college when the professor asked you to give the origin of the *Labii Superioris alae que nasi*."

Sam ignored the soft impeachment, thought a moment and finally said, "Maybe I can do it. My brother-in-law and I have some cabins on the 'Royal George,' sailing next week from Bristol to Montreal, and we will see what can be done for you."

I could have hugged Sam, but I dare not give myself the luxury of hoping that it could be done. But it eventually was done, by a lot of shifting around and doubling up, and my "three girls" were given a fine three-berth first-class cabin on the upper deck and I was located in another first-class cabin with my friend, Dr. Thompson of Halifax, Nova Scotia, and a gentleman from Jacksonville, Fla.

I have frequently remarked that friends were among the choicest possessions that any man could have, and surely it was proven so in this instance. But for the devotion of Dr. Davidson and his brother-in-law, Mr. John D. Ivey of Toronto, Canada, I could not have secured passage on that ship for love or money. Mr. Ivey is an exceedingly busy man with many and varied interests, and yet he devoted nearly one whole day to arranging matters for my passage. Luncheon time came and there were still some details to look after which no one but he could attend to. I urged him to go to lunch with me first, but he said: "No, thanks; you and Sam have lunch, and I will look after this little matter. I'd rather do this than eat." The longer I live the more I am struck with the fact that the world is filled with fine people. You meet them everywhere, and I am thoroughly convinced from my experience in Paris and

London that if I were stranded on the sands of Sahara, without a soul in sight, some genial chap would bob up from behind a mound of sand leading a camel and say to me, "Stranger, would you like a ride?"

Later it transpired that Mr. Ivey could not leave London in time to sail on the "Royal George," and I was happily instrumental in securing his cabins for my friend, Dr. Truman W. Brophy of Chicago, who, with his daughter, were refugees with us in London. Matters were thus shaping themselves more and more to our satisfaction, provided—always provided—the "Royal George" was permitted to sail. No one knew even a few hours in advance what might happen, and I shall never forget the suspense of the last few days in London. The "Royal George" had been scheduled to sail August 12th, but her sailing was advanced two days to the 10th. No one knew at that time what a single day might do, and it was deemed wise to get her out at the earliest moment. The pressure on the officials of the Canadian Northern Steamship Company, owners of the "Royal George," was very severe. Mr. William Phillips, European traffic manager, and Mr. W. J. Cartmel, general passenger agent at London, had the brunt of it. I was in Mr. Phillips' private office the day my passage was being arranged, and he was snatching a sandwich and trying to drink a cup of tea between telephone calls and other duties. One man called up and offered him £400—about \$2,000—for a cabin to Montreal. Mr. Phillips replied: "I am very sorry, sir; but we haven't a vacant cabin on the ship. If we had one you should have it at the regular passage rate; but no matter how much money you had I could not get you on this boat."

During the interval between the time I secured our passage and the sailing of the "Royal George" we attempted a little sight-seeing in London, but it may be imagined that we were not particularly enthusiastic over it. Somehow there was no heart for sightseeing when at every turn we saw the grim preparations for war. I have nothing but the most confused recollections of the places we visited, and some day I am going back to London and give myself the pleasure of visiting these places and studying their various points of interest. One afternoon we rode out to Hampton Court on top of a motor bus,

which gives one a most delightful view of the surrounding country. We strolled around the grounds of this old palace and reveled in the numerous varieties of flowers and other garden decorations till we were tired. Finally we saw "The Vine," which, after all, left the most vivid and lasting impression on my mind. The vine is an ancient grapevine with a trunk like a tree and its branches spreading over an immense area under a covering of glass. I cannot begin to tell how many magnificent clusters of fine, large grapes there were on that vine, but they were prodigious in quantity and apparently of the most excellent quality. It is claimed that the vine is either 200 or 700 years old—I have forgotten which. But it doesn't really matter. It looked as if it had been there forever and would continue to remain there forevermore.

On Sunday we went to St. Paul's cathedral, that venerable and mammoth old edifice, with magnificent dome, sepulchral echoes and the hardest and most uncomfortable wooden benches I ever sat upon. And they were needed. We listened to a sermon so long that I defy any man to keep awake all the way through unless he was sitting on a seat that slowly tortured him. The sermon was read from manuscript, and that kind of a sermon lacks the spontaneity and inspiration to keep people wide awake. Some time I want to look leisurely through St. Paul's and read the inscriptions on all of the monuments and make myself familiar with the records of the men who have gone before. They seemed to deal largely in dead men all over London and Paris, and when I got through St. Paul's and Westminster Abbey I felt about a thousand years old myself.

We visited the Abbey one afternoon and I have scarcely recovered from it yet. I never saw such evidence of age. The stone steps were worn deep by the tread of countless thousands of feet. The sharp corners of the stone walls were rounded by wear, and these corners were the nearest to being clean of any part of the edifice. The whole place looked as if it needed scrubbing, but I suppose most of the dust is worn in by this time and could not be scrubbed away; and then, besides, it might be sacrilegious to remove any of it.

As everyone knows, Westminster Abbey is the final resting place of kings, queens and notable people of the realm. Some

of the stained glass windows are figured to represent the lives and works of great men long since gone. For instance, we saw near the rear of the chapel a Chaucer window, and there were numerous tablets to the leading lights of literature, art and war. By the way, the benches in this chapel were very nearly as hard as those of St. Paul's, and fully as uncomfortable. I suppose it is all right, but I had somehow looked for a different setting to the picture both in St. Paul's and Westminster Abbey. And yet, as I thought it all over afterward, I was impressed with the fact that England is right and I was wrong. If St. Paul's or the Abbey had been exclusive and difficult of approach, or if they had been luxurious in any way, the common people would not have had the same free access which they enjoy today, and neither of these edifices would have fulfilled the particular function by which they can do the greatest good to England and the world. As it is, the poor people have the same privilege as the rich. They can go freely into these venerable old piles of historic interest and see there the homage which the nation pays to her illustrious dead.

Everything is open without price except one—the tombs of the kings. You pay a small fee and are escorted around by a clerical-looking gentleman who explains all about the various tombs. It would be interesting to recite some of these explanations, but space will not permit, though there were two tombs which stand out in my memory from the many we saw. On one side of the edifice is a large, high tomb with the figure of a woman lying along the top, and directly opposite it on the other side is another tomb with another figure. One was the tomb of Elizabeth, Queen of England, and the other the tomb of Mary Queen of Scots. Ah, me! As I thought of all the turmoil of the days in which these two queens lived, of the poor little widowed Mary coming back from France to Scotland at the age of nineteen, of the seven stormy years in Scotland, of her flight across the border into England imploring pity from Elizabeth—her only crime having been that as a mere child she had claimed the crown of England through the illegitimacy of Elizabeth, which was acknowledged—of her being cast into prison by Elizabeth, who never forgave her rival; of those terrible nineteen years in an English prison; of her

farcical trial before thirty-six royal commissioners, and her pathetic defense, alone, with no advocate to plead for her; and then, as I thought of that unjust decision condemning her to death, and the equally unjust and brutal act of Elizabeth in signing the death warrant; and, last of all, as I closed my eyes and pondered on that cold, gray morning in February, 1587, when, in one of the castle halls of Fotheringay, the poor, broken-hearted queen, only forty-five years of age, had her head chopped from her body on a block—as I thought of all of this and then looked at the tombs of these two queens lying peacefully side by side under the same roof, I said to myself that in the more than three centuries which have passed since then the world has grown better and better. And I blessed the fate that made me live in the twentieth century instead of the sixteenth. The misery, and intrigue, and violence of those days seemed so far removed as I stood in the musty halls of the dear old Abbey, where all was peace, and mellowness, and content.

And then, as I walked slowly out of the Abbey, my head bowed with the thoughts of those terrible days, I looked up and I saw soldiers marching the streets of London *to go to another war*. And I began to wonder, after all, how far we had advanced. The soldiers seemed a defeat of my aspirations and my ideals—and yet there is surely this difference: No longer do kings and queens dare to behead each other, no longer are innocent little princes murdered in the Tower, no longer do religious fanatics burn each other at the stake, and no longer is assassination considered as a legitimate political weapon.

After all, we may be advancing. I hope so.

C. N. J.

(To be continued.)

BOOK REVIEWS.

PATHOLOGY AND BACTERIOLOGY FOR DENTAL STUDENTS. By Guthrie McConnell, M. D., Assistant Surgeon, Medical Reserve Corps, U. S. N., formerly Professor of Pathology and Bacteriology in the Philadelphia Dental College. 12 mo of 309 pages, with 108 illustrations. Philadelphia and London: W. B. Saunders Company, 1915. Cloth, \$2.25, *net*.

It would be impossible to adequately discuss one of these subjects without including the other, so closely are they interwoven. In this book they are treated in a rational way, and the sequence is clearly maintained. The book is well written and entertaining throughout, and the student who masters it will be acceptably informed on the subject. The chapter on "Infection" is in itself worth the price of the book, taking up as it does the consideration of immunity and susceptibility—a question of growing importance to the dentist. In Chapter VII. the author attributes the deformed upper central incisors, known as "Hutchinson teeth," to hereditary syphilis, leaving the impression that this is the only cause of such teeth. It seems to be the consensus of opinion in recent years that these teeth may be deformed by other agencies than syphilis, in short, that the so-called "Hutchinson teeth" are not necessarily pathognomonic of syphilis.

The book as a whole will well repay a careful study on the part of the student, and there are many things of intense interest to the general practitioner. The publishers have shown their customary care in the mechanical make-up of the book, and have produced a volume worthy of the author.

THE REPORT ON ODONTOMES. By the Committee Appointed by the British Dental Association; Douglas P. Gabell, L. R. C. P., M. R. C. S., L. D. S.; W. Warwick James, L. R. C. P., F. R. C. S., L. D. S.; J. Lewin Payne, L. R. C. P., M. R. C. S., L. D. S. 135 pages, nearly 100 illustrations. Price, 7 s. 6 d., *net*. Published by the British Dental Association, 19 Hanover Square, London, W. England.

The profession must ever consider itself deeply indebted to the British Dental Association for inaugurating this work, and particularly to the committee for so successfully carrying it out. It

is a very comprehensive work on this subject, worthy of the best traditions of the association which publishes it. The illustrations are mostly from photographs, though some engravings are used, and all are excellently done. Specimens were obtained from various colleges, society museums, and hospitals; twenty-one in all being credited with contributions. This gives some idea of the extent of the work. We do not recall any other book which so perfectly covers this subject, and we commend it most highly to those who are interested in this particular field of pathology.

FEDERAL NARCOTIC RECORD BOOK. For Physicians, Dentists and Veterinarians. A Daily Record of Narcotics Dispensed or Distributed. Price, 25 cents. Published by the Abbott Laboratories, Chicago.

This little book is designed as a convenient means of keeping a record of all narcotics prescribed by the practitioner under the restrictions of the federal narcotic law. It also contains a statement of the law as it affects Physicians, Pharmacists, Veterinarians and Dentists. It is bound in cloth, is of a convenient size, and consists of 120 pages. It is well worth the small sum asked for it.

CORRESPONDENCE.

THE PROCESS PATENT FROM THE STANDPOINT OF MEDICAL ETHICS.

TO THE EDITOR:

The medical profession has nothing but contempt for such a thing as the patenting (for royalties) of any method or process used in the relief of human suffering or used in the restoration of tissues or organs lost by disease or accident. Such a patent, having for its purpose the exaction of royalties, is as unethical in dental surgery as in general surgery or medicine. The principles involved are the same. A wrong precedent established by our dental profession would be as dangerous to the medical profession as it would be to ours. Imagine the influence upon future research had Jenner, Lister, Pasteur, Black or the Mayos patented their ideas and demanded heavy royalties by means of harassing lawsuits and injunctions!

In view of the inevitable drawing together of the two

professions, so apparent every day, what our medical brethren think of our questionable practice of patenting processes of restoring lost tissue is to us a matter of grave concern. We dentists may well ponder the following *recent* expressions of opinion from some of our most prominent medical men:

Dr. James A. Clark, President Chicago Medical Society: "It (the process patent) is an unheard of thing in the medical profession. A man who tried such a thing as you suggest I imagine would be ostracized by the whole profession. So far as my observation goes, any reputable physician has always made public (to the profession) his technique and has been only too happy to have others adopt it if they saw fit. I am surprised that your profession tolerates any such methods. None of us can control quacks and irresponsibles, but organized medicine and dentistry can keep their own house clean."

Dr. Victor C. Vaughan, President American Medical Association: "I am sorry to know that the ethical standards are so low among dentists. Certainly no medical man would patent anything for royalties which can be used in alleviating human suffering. I do not believe that operations for restoring tissues or organs lost by disease or accident can be patented. * * * I am surprised that any dentist, or anyone else, should think of patenting such a thing. It certainly is not a high standard, and I do not believe that a profession can be called a scientific one and permit its members to patent such things."

Dr. A. L. Bittin, President Illinois State Medical Society: "The medical profession does not look with favor upon the matter of patenting, the sense which I believe you use the term, any method of procedure whatsoever."

Dr John A. Robinson, President Illinois State Board of Health: "Ethical members of the medical profession have always avoided patenting medicines, methods or processes which would be of benefit to suffering humanity. * * * When a profession becomes so commercialized as not to give to men freely its progressive knowledge, that profession sinks into the mire of individual selfishness. However, the best way to defeat the plan of patenting surgical instruments, methods or processes is for all ethical surgeons and dentists to refuse to use them."

Dr. W. A. Evans, Chicago: "The ethics of the medical

profession would not allow one of the members to patent a process or method 'of repairing lost tissues, for example, human bone with animal bone.' They are not even allowed to patent surgical instruments."

Dr. Charles H. Mayo, Rochester, Minn.: "It is such things that make a man's vocation a real business instead of a profession."

Dr. Frank Billings, Chicago: "I do not believe a physician or dentist should patent any process or instrument for the treatment of suffering humanity, it makes no difference what the process or instrument may be."

Dr. John B. Murphy, Chicago: "I know of no instance, nor have I ever heard of one, in which a medical man has patented a method or process of treating diseases, either in the Chicago Medical Society or any of the other societies of which I am a member."

Dr. Charles J. Whalen, President-elect Chicago Medical Society: "The code of ethics under which we claim to operate forbids the patenting of any contrivance used in the treatment of disease or deformity of the human being. Having established such a standard the violation of same, whether done by a dentist or physician would make no difference, I would therefore, consider it unethical for any medical man to patent for royalties methods or processes for restoration of tissues or organs lost by disease or accident. Thank you for writing me."

What is the remedy? "None of us can control quacks and irresponsibles, but organized medicine and dentistry can keep their own house clean," says Dr. Clark. Since the overwhelming majority of the members of our profession are ethical and opposed to the unethical practices which threatens us with ostracism from the fellowship of reputable professions, we can at least prevent patent promoters from coming before our ethical societies with alleged new discoveries and after securing their adoption, covering the ideas with patents and demanding millions in royalties.

Medicine has made progress without process patents. Why not dentistry?

The addition to our code of ethics of a section like the following will doubtless remedy the evil:

"It is unprofessional to receive, or aid others in obtaining, remuneration from the sale or lease of patents on any method

or process used in the relief of human suffering or used in the restoration of tissues or organs lost by disease or accident."

Should the profession ever be made to suffer from patents and royalties on instruments, that bridge can be crossed when we come to it. It is not an issue now.

H. C. NEWTON.

LETTER FROM DR. EDMUND NOYES.

I have been informed that there is a desire on the part of some members of the Chicago Dental Society to add a section to our code of ethics as follows:

Sec. 8.—"It is unprofessional to receive, or aid others in receiving, remuneration from the sale or lease of patents on any method or process used in the relief of human suffering or used in the restoration of tissues or organs lost by disease or accident."

If I understand correctly, the scope of the addition proposed does not go as far as the medical profession in their "Principles of Medical Ethics," which says, "It is unprofessional to receive remuneration from patents for surgical instruments or medicines." I suppose what is proposed is intended to forbid the taking of patents for "methods or processes," but not for instruments, appliances or apparatus. I judge many men are desirous to go the whole length and put the dental profession squarely on the same footing as the medical profession in respect to patents. I am very doubtful in my own mind if it would be wise or useful for the dental profession to adopt such a policy.

We are dependent to a far greater degree than the medical profession upon mechanical tools, machinery and apparatus, and also upon mechanical methods and processes, and we cannot so well afford as the medical profession can, to serve notice to everybody in our profession that no one may expend inventive genius, or time or money for the improvement of our equipment or resources beyond what he is willing and able to bestow upon his profession as a free gift. I am willing to grant, however, that most of such contributions should be freely given to the profession, and as a matter of fact, they are at present, without any requirement formerly expressed in our code of ethics. Public opinion will grow stronger and more influential in the future, and will accomplish about all that would be accomplished by

such an addition to our code of ethics, while the present status leaves us free to reward the very rare instances in which very great benefits are conferred by some invention or method, at great cost to the inventor.

I am especially opposed to the introduction of such an addition to our code at this time, because its most conspicuous immediate effect, and I suppose its immediate purpose also, would be to give encouragement and support to all those (and they are practically the whole dental profession with the exception of the members of the Dental Protective Association) who have shown unmistakable desire and determination to rob Dr. Taggart of any financial reward for the great benefits he has conferred and the great sacrifices he has made. The proposed action, if carried out, would ostracise him from his profession. Don't you think he would feel amply rewarded for the millions of dollars of benefits he has been chiefly instrumental in conferring upon his profession and the patients whom they serve!

It should be recognized that the attitude of the medical profession with respect to patents does not stand upon any requirement of morality. It is impossible upon purely ethical grounds to make it out to be wicked to hold and benefit by a patent and not wicked to hold and benefit by a copyright. The case is simply that the medical people, as an organized profession, have agreed and promised that all of their members shall renounce all benefits they might receive by means of patents, and shall dedicate all such to the public; and the willingness to make such dedications and renunciations is made a test of professional fellowship. To compensate in some measure for these sacrifices and replace the incentive thus taken away, provision has been made in many places by which men may devote themselves to research and invention for the medical profession and have their living, at least, provided for. The dental profession has only made a beginning. I refer to the work of the research committee of the National Dental Association, and the Evans Institute in Philadelphia, and perhaps the Forsyth Infirmary in Boston. I think these should be developed to a much greater effectiveness than at present before we undertake (if it should ever be wise to do so) to deprive our men of benefits under the patent laws in the occasional instances in which it is really necessary.

E. NOYES.

PRACTICAL HINTS.

Edited by J. E. Schaefer, D. D. S.

(This department is for busy readers. We want short articles containing practical hints—the shorter the better. No article must exceed 200 words, unless of exceptional merit. Every dentist has some useful hint that has been of value to him, and if he will only put it in print it may be of equal value to others. That is what this department is for. Due credit will be given for every article sent. Address J. E. Schaefer, 1745 W. Harrison St., Chicago, Ill.)

To Remove Ink Stains:—When the finger is stained with ink and you have no sand soap in the office, just take a match, moisten slightly and rub over the discolored parts.—*F. S. Dilger, D. D. S., Chicago, Ill.*

Use 70% Alcohol:—Use 70% alcohol in preference to absolute as it is more active. The stronger alcohol increases the resistance of the bacteria by the dehydration of them.—*Lester F. Clow, D. D. S., Chicago, Ill.*

A Vulcanized Base-Plate:—In the case of the flat lower jaw it is a good plan to vulcanize the plate first, then there is something substantial on which to take the bite and set up the teeth.—*L. P. Haskell, Chicago, Ill.*

To Remove Amalgam From the Fingers:—After kneading and squeezing out excess mercury, the thumb and index finger are more or less coated. It is then hard to work with crown gold without tarnishing same. Clean the fingers by heating a piece of bees wax slightly, and press firmly between coated fingers.—*P. J. Pecau, D. D. S., Lebanon, Ill.*

Saving Pulp:—Some possibilities of saving the pulp in a tooth that is to serve as a pier for a bridge. The restoration of a single missing lateral, suspended from a vital cuspid by a hood attachment, is an instance. Again, in mouths of middle-aged patients in need of bridge work, a molar of favorable shape, with evidences of secondary dentin formation, permitting the proper preparation without shock, which on the other hand would present

difficulties to perfect root-canal work.—*M. L. Schmitz, D. D. S., Chicago, Ill.*

A Porcelain Baked Crown:—A crown which I believe still has a place in this work, is the porcelain baked crown. Since the advent of the different makes of the all porcelain crown and the casting method the porcelain baked crown has in the majority of offices been relegated to the past; but in some of the long bite cases where the gum line at the labial or buccal is high and at the lingual low the porcelain baked crown meets the condition possibly better than any other.—*R. E. MacBoyle, D. D. S., Chicago, Ill.*

Porcelain Crown With Lingual Telescope:—This is used for anchoring removable bridges or dentures. After having made the cap and post in the usual manner for a porcelain crown, a tube is made of 28 gauge iridio platinum plate to about the size of 8 or 9 gauge wire, and soldered to the floor of the cap. Now proceed to grind in facing and bake the crown. After the crown is baked and finished, use 36 gauge pure gold to burnish around the tube on crown. Then fit a piece of 26 or 28 gauge clasp metal around the pure gold and solder the two together, finish and you have the clasp for any kind of a case you see fit to make. By using the pure gold and clasp metal in the above manner a certain degree of accuracy is assured in the fit as it telescopes evenly, and when the clasp loosens to tighten it is a very simple matter for a prosthetic dentist.—*G. W. Schwartz, D. D. S., Chicago, Ill.*

The Porcelain-Gold Shell Crown:—If the pulp is devitalized, which I think is generally required in crown work, place a pin in the root and let it extend almost to the occluding point.

Remove all enamel and cone shape the remaining tooth, letting the pin be the apex. Make cone of platinum as in porcelain shell operation. Select facing. Concave it, and back with platinum. Wax it to cone, as you wax facing to floor of Richmond, remove and invest, as in Richmond, flow solder over cone and backing, amount to suit the case.

Finish and cement to position. You will then have as strong a porcelain crown as can be made. It will hold any kind of bridge-work.

You will never have a split root. You will have the most perfect adaptation. You will have the least possible amount of irritation. It is easily and quickly made. It can be so constructed that absolutely no metal is visible. It can be used from bicuspid to bicuspid inclusive.—*J. A. Heaton, D. D. S., Hoopeston, Ill.*

Porcelain Jacket Crowns:—For single crowns or small bridges, the porcelain jacket crown is not only universally applicable, but it is one of the most practical and cosmetic means of restoring the teeth.

A badly broken down incisor, for instance, where a porcelain inlay would be contraindicated, and where the ordinary crown would necessitate its devitalization and a post in the canal with its ever present danger of splitting the root, can readily be restored to its life-like appearance by means of a porcelain jacket crown.

In cases of malocclusion, the jacket crown is indicated to bring into proper alignment the teeth without moving them, by properly grinding them, and by so building up the jacket crown and contouring it, that it will take its place in the arch in perfect alignment.

Many cases of malocclusion that ordinarily would require the services of an orthodontist for one or two years, have been treated in this manner in a very short time without devitalizing the pulps and with satisfactory results.

The porcelain jacket crown is also indicated in cases where there is a missing tooth in the arch. One of the adjacent teeth is covered with a jacket crown, a porcelain tooth made to fit the space, and the two are then fused together, making a bridge that is not only beautiful and life-like in appearance, but very durable as well.—*Harris J. Frank, D. D. S., Chicago, Ill.*

Pure Gold Inlays:—The reproducing of wax moulds of inlays into a metal which, when cast, does not shrink to any appreciable degree, giving the operator an inlay which adapts itself perfectly to the cavity and still is of sufficient hardness to withstand the force of heavy occlusion, has been and is, somewhat of a problem.

Pure gold when cast becomes quite soft; yet gives clearer, definite outlines than any other metal or combination of metals. An inlay cast of pure gold adapts itself to its cavity, closer than an inlay cast of any other metal, and can be condensed or tempered by

malleting and burnishing so that inlays cast of pure gold will stand heavy occlusion, without wearing or flowing, to a greater degree than a filling of gold foil.

To condense an inlay cast of pure gold, first—the inlay should be practically finished, that is, the contact restored and margins burnished; then place the inlay in the cavity, having the patient close the mouth and direct the motion of the jaws as in process of mastication. In this way the points of heavy occlusion may be determined by the marks of the opposing tooth on the surface of the inlay. Remove the inlay from the cavity and invest in modeling compound, chill, and then with a finishing plugger in your engine mallet the inlay may be condensed, especially at the points indicated by markings where the heaviest occlusion occurs, without fear of distorting your inlay.—*E. C. Pendleton, D. D. S., Golden, Ill.*



MEMORANDA.

[Society notices will be given insertion in this department free of charge. Subsequent insertions will be charged for at the rate of \$2.00 an inch.]

DR. L. P. HASKELL.

Recently Dr. Haskell was obliged to undergo an operation for cataract. While in the hospital he received word that he had been elected Honorary President of the Panama-Pacific Dental Congress. "You cannot keep a good man down."

IOWA STATE BOARD OF DENTAL EXAMINERS.

The next meeting of this board for the examination of candidates for licenses will be held at Iowa City, Iowa, commencing Monday, June 7th, at 9 a. m. For application blanks and so forth address the secretary, Dr. J. A. West, 417 Utica Bldg., Des Moines, Iowa.

INDIANA STATE BOARD OF DENTAL EXAMINERS.

The next meeting of the Indiana State Board of Dental Examiners will be held at the State House, Indianapolis, commencing June 14th and continuing six days. For application blanks and full particulars address Dr. Fred J. Prow, Secretary, Bloomington, Ind.

ILLINOIS STATE BOARD OF DENTAL EXAMINERS.

The next annual meeting of the Illinois State Board of Dental Examiners will be held at the Northwestern University Dental School, Chicago, commencing 9 a. m., June 10th. Application, together with fees, must be on file in secretary's office at least ten days prior to date of examination. For further information apply to Dr. O. H. Seifert, Secretary, Springfield, Ill.

DEATH OF DR. KIRK DAVENPORT.

Dr. Kirk A. Davenport, of London, England, died suddenly at the age of forty-six. He was graduated from Pennsylvania College of Dentistry and later from Harvard University. He studied in Europe and started the practice of his profession in Dresden, Germany. He later moved to London. He was a past president of the American Dental Society of Europe, and was a member of several American societies in England. Dr. Davenport leaves his wife and a son and daughter.

TEXAS STATE BOARD OF DENTAL EXAMINERS.

The next regular meeting of the Texas State Board of Dental Examiners for the examination of applicants for license to practice dentistry in the State of Texas will be held in the High School building, Dallas, Texas, beginning June 21, 1915, at 9 o'clock a. m. No interchange of licenses with other states. No diplomas recognized. Rules governing examinations and official application blanks will be sent upon request. All parties desiring to take this examination should send their application, accompanied by a fee of \$25.00, to the secretary not later than June 15th. For further information address C. M. McCauley, Secretary, 434 Wilson Bldg., Dallas, Texas.

PATENTS OF INTEREST TO DENTISTS.

1098972. Suction cup for dental plates, Harry R. Priest, Loudonville, O.
 1099101. Impression cup, Lusius Robertson, Madisonville, O.
 1099248. Repairing dental fillings, Jephtha C. Hollingsworth, Kansas City, Mo.
 1099393. Artificial tooth, Samuel H. Pollock, Rocky Ford, Colo.
 1100431. Toothpick machine, Albert H. Hall, West Peru, Maine.
 1101439. Dental appliance, Jephtha G. Hollingsworth, Kansas City, Mo.
 1101947. Guard and grinding wheel moistener for dental handpieces, Newton Morgan, Springfield, Mass.
 1101810. Means for securing dental plates in position, Grover C. Otrich and J. L. Eischof, Belleville, Ill.
 1101885. Dental clamp, John A. Sawhill, Kansas City, Mo.
 1102850. Dental crown-post extractor, Thomas R. Arden, Philadelphia, Pa.
 1102390. Dental model, Van Broadus Dalton, Cincinnati, Ohio.
 1102401. Dental floss holder, Frederick O. Gamble, Chicago, Ill.
 1102584. Blowpipe, Franklin Gleich, Alliance, Ohio.
 1102741. Dental articulator, Robert Hardie, Ashfield, near Sydney, N. S. W.
 1102753. Device for shaping dental wooden sticks, etc., James W. Ivory, Philadelphia, Pa.
 1103184. Apparatus for baking porcelain and similar substances in continuous furnaces with movable hearths, Ernest G. Faugeron, Montereau, France.
 1103879. Tooth brush, Edward F. Hoffman, Glandorf, Ohio.
 1103515. Tooth brush, Sylvester R. Husch and G. S. Husch, New York, N. Y.
 1103606. Orthodontia pliers, C. F. Montag, Blue Island, Ill.
 1103088. Dental pattern wax, Heinrich Schweitzer, New York, N. Y.
 1104290. Removable attachment for compensating malarticulation of teeth, Merrill S. Charles, Los Angeles, Cal.
 1104650. Holder and sterilizer for dental burs, Howard J. Fries, Seattle, Wash.
 1104662. Sanitary dental impression tray, Garrett L. Grier, Milford, Del.
 1104459. Tooth brush, David Weiss, Cleveland, Ohio.
 1104425. Dental casting apparatus, Harry V. Hart, Quincy, Ill.
 1105456. Dental lathe-file, Walter F. Richards, Quincy, Ill.
 1105476. Artificial tooth, Robert M. Withycombe, Sydney, N. S. W.
- Copies of above patents may be obtained for fifteen cents each by addressing John A. Saul, Solicitor of Patents, Fendall Building, Washington, D. C.

ANNUAL MEETING OF THE MEMBERS OF THE DENTAL PROTECTIVE ASSOCIATION OF THE UNITED STATES.

The regular annual meeting of the members of the Dental Protective Association of the United States was held at the LaSalle Hotel in the city of Chicago on Monday afternoon, Dec. 21, 1914. Due notice in writing was given to each member of the Association of this meeting in compliance with the requirements of the by-laws, and notification was also published in the daily press. The president, Dr. J. G. Reid, presided. An unusually large number of members was present but in order to give those who were unable to attend some idea of the present status of the Association those at the meeting proposed that a brief synopsis of the secretary's and treasurer's report be published in one or more publications of general circulation among dentists.

The secretary, Dr. J. P. Buckley, presented a detailed report of the

activities of the officers and directors during the year, described the organization of the board, the election of the officers and the taking over of the books and records of the Association from the administrative officers of the preceding years. He commented particularly upon the thorough, accurate and business-like manner in which the former president, Dr. J. N. Crouse, had kept the books and records of the Association and carried on the voluminous correspondence entailed by the agreement entered into with Dr. W. H. Taggart on behalf of the Association.

The Association has now about eight thousand members upon its books, nearly five thousand of whom paid the special assessment in 1900 while over forty-two hundred availed themselves during 1910 to 1912 of the agreement entered into with Dr. Taggart and paid the requisite fifteen dollars.

The officers of the Association increased the annual revenue by changing the investments during the year in purchasing twenty-one thousand dollars (\$21,000) of municipal bonds of the highest grade at exceptionally low prices, as the bonds were purchased at the time when the market was at the lowest ebb, due to the foreign war. About five thousand dollars in cash remains on deposit at a low rate of interest in substantial savings banks in the city in charge of Dr. D. M. Gallie, treasurer, who has given a Surety Company's bond to the Association in the sum of five thousand dollars. The directors during the year amended the by-laws so as to require that the securities and other valuable papers of the Association be deposited in a box rented in the name of the Association in one of the large safety deposit company's vaults with the requirement that the box may be opened only in the presence of two members of the Board.

Certain doubtful assets which have remained stagnant for many years were converted and are being liquidated in a satisfactory manner so that the finances of the Association are in excellent condition.

The secretary further called attention to the statement which he caused to be published in the Bulletin of the National Dental Association in the October issue emphasizing the fact that the Dental Protective Association of the United States was still in active business, had more than twenty-five thousand dollars (\$25,000) in the treasury and was prepared at all times to carry out the purpose of its organization. To this published statement of October last the secretary now directs the attention of all members who are still in doubt as to their status under the Taggart agreement.

From the treasurer's report for the year ending December 10, 1914, the following facts may be mentioned:

The treasurer received as a cash balance on hand at the beginning of the year twenty-five thousand, six hundred twenty-eight dollars and thirty-five cents (\$25,628.35). The receipts during the year from all sources amounted to two thousand thirty-six dollars and seventy-eight cents (\$2,036.78). The disbursements during the year were two hundred forty-seven dollars and five cents (\$247.05) exclusive of the purchase of twenty-one thousand dollars (\$21,000) of bonds, which amounted to a change merely in the form of the assets. The total assets of the Association on December 19, 1914, amounted to thirty-five thousand two hundred eighty-seven dollars and fifty-eight cents (\$35,287.58), of which twenty-seven thousand two hundred eighty-seven dollars and fifty-eight cents (\$27,287.58) was in municipal bonds and cash and eight thousand dollars (\$8,000) in individual notes secured by a corporation note for three times the amount.

The present Board of Directors were re-elected for the ensuing year.

(Signed)

J. G. REID,
J. P. BUCKLEY,
D. M. GALLIE,
Board of Directors.

THE DENTAL REVIEW.

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No. 6

IMPORTANCE OF EARLY DIAGNOSIS OF MALIGNANT TUMORS OF THE MOUTH.*

BY VILRAY P. BLAIR, M. D., ST. LOUIS, MO.

It is always a pleasure to be asked to come before you, and in thinking over a possible subject I took one which is of vital interest and one in which you bear a special responsibility—it is the matter of tumors of the mouth.

Most tumors in the mouth are carcinomata. About five years ago, Butlin made some inquiries through the Registry General in England and found that about seven hundred thirty people died every year in the British Isles from carcinoma of the tongue alone. He figured that there might possibly be seventy more cases each year cured by operation, eight hundred cases occurred each year, and out of this eight hundred, seven hundred thirty died. As a matter of fact, the cure of carcinoma of the mouth should be very close to 100 per cent. I will undertake to show you why it should be so. The two reasons why carcinoma of the mouth has such an extremely high mortality are the late and insufficient treatment, yet a visible prodromal stage of the disease or a visible predisposing factor usually exists for months, often years, before active malignancy develops, and for an uncertain time after this it remains localized. These tumors are prone to develop about or after middle life, at a time when people need attention to their teeth, and in this country there are very few people who do not consult a dentist. Many people carrying visible predisposing lesions will have given some dentist the opportunity of examining their mouths during this period.

For these reasons I say that upon the dentists rests a part of

* Read before the St. Louis Dental Society, Feb. 9, 1915.

the responsibility for the extremely high mortality for tumors of the mouth. Their responsibility would be greater were it not that only too often a timely hint by the dentist goes unheeded. It is the dentist who has the chance to observe these lesions early. It is by education of the public and the profession to the necessity of early diagnosis and impressing upon patients the importance of paying attention to mouth lesions that this deplorable condition can be corrected.

In one hundred seventy-two cases of tumors of the mouth entering the Massachusetts General Hospital, about 29.07 per cent were inoperable when presented for treatment. That this can be corrected will be shown by some figures I have jotted down.

It is estimated that 14 per cent of Bilroth's cases of cancer of the mouth remained cured for nine months. That is the best that could be shown in his time. Things improved through better operative, but chiefly through educational measures, until at the time of his death Butlin could show about 45 per cent cures. The time test for a cure is arbitrarily set at three years, but it may return after this period. Butlin spent his life trying to educate the English people to the importance of this early diagnosis. In the Johns Hopkins clinic, results of education are very nicely shown in the following:

Taking a period running eighteen years before the first of the year in 1908, and five years after 1908, including 1908-1914, it was found that during the period of the early eighteen years only 8 per cent of the carcinomata of the tongue were early lesions, while in the five years following 1908, that this percentage of early cases absolutely curable rose from 8 per cent to 30 per cent. In the eighteen years previous to 1908 the inoperable cases that presented themselves were 18 per cent of all cases, while in the following five years the inoperable cases were reduced to 10 per cent, and as a result of this, the cures in the eighteen years previous to that had been 21 per cent, and he figured in the five years since that they were 50 per cent.

Hippocrates recognized carcinoma of the mouth and treated it. The first good clinical description was by Wiseman in 1676, but it was not until the latter half of the nineteenth century that it was clearly distinguished from syphilis. It is probable that

with the wide spread of syphilis toward the end of the middle ages, and with the introduction of tobacco, that carcinoma of the mouth took a great forward step in its ravages.

It is being recognized that carcinoma probably is not a primary lesion, but that it is dependent upon some pre-existing disturbance that may be present for some time.

In the mouth, a strong predisposing factor toward carcinoma is a chronic irritation such as a jagged tooth, the use of irritating hot foods or alcohol, possibly spices, and high in the rank of causative factors is tobacco. Recently we have been led to believe the most potent of all is syphilis. Therefore you see that with the proper treatment of syphilis, we have hope of partially eliminating cancers of the mouth. Any form of a chronic irritation of the mouth may be followed by cancer. It is believed that 75 per cent of all carcinomata of the mouth are preceded by some pre-existing lesion, which in many cases existed for quite a long period before the carcinoma develops.

One of the commonest of these pre-existing factors is leukoplakia, and every leukoplakia patient should be warned of its possible development into carcinoma. About 50 per cent of the carcinomata of the mouth are preceded by leukoplakia. Right there you can recognize an instance where you can be helpful in the guidance of patients. Every patient who has a leukoplakia should be warned. Of course you know the importance of correcting a tooth irritation.

As to the end and immediate results of the treatment of carcinoma of the mouth, carcinoma of the lip is not so malignant as carcinoma of the tongue or other intra-oral sites, and the usual run of results are rather good. It has been recognized, and I will emphasize it later, that inadequate treatment is worse than none. It stimulates carcinoma to grow. Bloodgood has divided his lip carcinomata cases into two clinical kinds, those that have received some treatment of some kind not radical he designates as secondary, and those that have received no treatment he calls primary. He further has made the following distinctions in operated cases, those which had only a local operation and those that had local operation and also an operation on the glands in the neck, again subdividing the latter into two classes, those in which the glands of the neck showed carcinoma infection and those which did not. He gives the following results:

Primary cases with only local excision, 63 per cent cures. Primary cases having both local and neck operations, the glands being free of disease, 95 per cent cures. Primary cases in which there are local and neck operations, glands already infected, gave only 50 per cent cures.

Coming to the secondary cases, the thing changes; in cases with only local excision, cures drop from 63 to 20 per cent. Secondary cases where there was complete operation on neck and lip in which the glands of the neck showed no carcinoma, the cures dropped from 95 to 60 per cent. In secondary cases in which the glands of the neck showed involvement, the cures dropped to 20 per cent. So much for what you might call pernicious activity.

I have already given you the results of carcinoma of the tongue, and they are about as good in carcinoma of the lower jaw. Carcinoma of the upper jaw gives bad results. The operative death rate in mouth carcinomata, operated upon at the proper time, should be nil. Even now the death rate from operating on the lip, unless so extensive as to involve bone, is very slight, but when you come to the tongue, the death rate gets very much higher. Butlin, with his perfect technique, kept the death rate at 10 per cent. His cases toward the end were early cases. Kocher, with his submaxillary operation, had a death rate of 20 per cent. When the carcinomata is so advanced as to require resection of part of the floor of the mouth or jaw, the death rate is 20 to 40 per cent, and some people have quoted statistics of an 80-per-cent death rate for operating on carcinoma of the tongue. Everything points to one thing—the early diagnosis and treatment of these cases.

The term, precancerous lesion, may designate a condition in which an epithelioma has begun to multiply but has not broken through the membrane, and which is strictly a local cancer. A little broader definition is any sort of a condition that may lead to cancer, but what is strictly not a cancer. On the lip, many carcinomata arise from a localized patch which may be crusting of the mucous membrane or a blister; another form is a papilloma. Many will follow what is called a "nicotine burn." These are, or will later turn into, cancer. The distinction is one of words, not facts. The local disease may exist on

the lip for years, but not always. It may be a very active cancer shortly after it appears. Over half of them will come from these "nicotine burns." The next two factors that seem most frequently to precede cancer of the lip are fever blisters and injuries, and any of them can be traced back to an insignificant lesion which has been neglected.

On the tongue, there are probably five conditions that may be the initial stage of a developing carcinoma: a little hard lump rising deep under the mucous membrane, a crack or a tooth ulcer which does not heal and the edges of which show a little chronic induration. Such a crack that does not heal may develop in a leukoplakia. There may come a plaque on the surface of a leukoplakia that may be the early form of the cancer. The most common and characteristic is a wart, and it is probable that a wart developing on the tongue of a person over forty years of age is an early form of cancer. A wart developing in a leukoplakia is always a cancer.

I was a little at a loss to know just how to illustrate my points and thought first of using lantern slides, but I do not think they would have expressed what I want as well as what I brought. Here are certain selected specimens of tumors which were chosen to illustrate certain points. The first is a specimen of carcinoma of the cheek with the following history:

"Two months previous to operation, while chewing tobacco, noticed a discomfort on the inner surface of the left cheek. Examination showed a sore place, which he does not believe has enlarged. At first the pain came only with irritation, but lately has had shooting pains in cheek." He had a small, early squamous carcinoma on the inside of the cheek, which was removed under novocain infiltration and is, I believe, a perfectly curable carcinoma. He has absolutely no deformity resulting, he was subject to nothing in any way dangerous in the treatment, and with the proper removal of the glands of the neck, I could almost promise a cure.

Here is another specimen of carcinoma of the cheek:

"No history of leukoplakia. Over one year ago had lump in side of right cheek without other symptoms. Was catuerized and has been enlarging ever since. Has never been painful." That man required an operation which was serious and in which

there was some danger. It has left his mouth deformed, in spite of the best plastic surgery I could do. He has also had the glands taken out of his neck. Remember this man went one year without proper treatment.

I have here a specimen which consists of half of the lower lip, half of the upper lip, cheek, including jaw bone and glands of the neck removed for a carcinomatous ulcer lying between the jaw bone and cheek, infiltrating into the cheek. The history is as follows:

"For years had been in the habit of biting the inside of the right corner of the mouth. About four months ago he noticed a sore there and it has spread until it now involves three-eighths of an inch of the lower lip, a little of the upper lip, the cheek as far back as the distal border of the second molar, and there is a mass of granulations sticking out of the socket of the first molar, which had been drawn three weeks ago. Base and edges of the ulcer are hard." This man was under the care of a doctor for four months before I saw him, and a local irritant had been used. Had it been done in time, a very small operation would have been sufficient, saving him serious risk to life and great deformity. He was operated upon five years ago and was still free of recurrence six months ago.

Here is another specimen of carcinoma which I believe originated in the cheek, but when I saw it it involved both jaws. He gives a rather peculiar history:

"He came to see me April 22, 1914, and said that last October, six months before I saw him, was struck on left jaw by the limb of a tree. Could not open jaw at any time since. Three teeth had been drawn from this region since the injury. Three or four months ago he found a sore in the mouth, which has grown since, painful at times and bled a little." This man had an ulcer in his mouth four months and it was neglected: Operation in his case necessitated removal of half of the lower jaw and half of the upper jaw, besides taking out the glands in the neck, and cost him his life. About two weeks after operation he bled to death. That case was under observation early enough, but failed to get treatment.

The history of a case of carcinoma of the external nose is as follows:

"Fifteen years ago had irritation on the nose from the bridge of spectacles, which persisted. Has had open ulcerations for five months, growing very rapidly lately. No pain in nose, but lately has been having frontal headaches and what she describes as a trifacial neuralgia of the right side." This is an instance of fifteen years' standing of some irritation which she should have been warned against. Carcinoma developing rapidly for five months required removal of the whole of external nose.

Taking up cancer of the tongue, I have here a specimen of a precancerous lesion or early cancer in a man fifty-five years of age. He had a leukoplakia for ten years, was sent to me some three or four years ago and was advised to let the leukoplakia alone. Every man who has observed much leukoplakia knows that any sort of active treatment is apt to induce cancer which is the very worst thing a leukoplakia can do. He had been advised to have it burned out, but we told him simply to watch it and return regularly for observation. He had already cut out smoking and drinking and in spite of a negative Wasserman reaction had been given a very active anti-syphilitic treatment. At a recent visit, after a certain point had been persistently painful, we found that he had at this site an early warty cancer. We took it out with a wide excision under a local anesthetic, doing immediate repair. He had a carcinoma of the tongue, but while it was still local, had it removed and I believe has a complete cure, with neither serious discomfort, risk to life, nor resulting deformity. If we had not warned this man of the possibilities of his leukoplakia, he might not have come back at such a favorable period for its removal.

The next case had a leukoplakia on the left side of the tongue for some years. This was irritated by a jagged tooth for some months and a lump was noticed in the leukoplakia three weeks ago. He has an old syphilitic infection. He had a typical early carcinoma of the tongue which was removed in the office for diagnostic examination. The cells were breaking through the basement membrane freely and it was necessary to remove half of his tongue and the glands from one side of his neck. He has a good chance for permanent recovery, but had to risk a 7 per cent death rate.

I now show two whole tongues with the cervical nodes and

body of the lower jaw attached to each. Fortunately, neither died from the operation, but the death rate from such operations is between 35 and 80 per cent.

One specimen is from a very old man, the history being as follows:

"Eight months ago he first complained of sore gums which have grown more and more sore, until three weeks ago, when he was compelled to give up wearing his teeth, and has two 'lumps' under the jaw. The right ear began to ache four months ago, the pain being intermittent and relieved by heat."

The other carcinoma of the whole tongue and jaw gave this history:

"About one year ago noticed a 'small pimple' on the under surface of the tongue, corresponding to the point where the pipe-stem touched the tongue. This area was touched with 'blue stone,' became larger and about three months ago broke open, discharging serum and blood. The patient has noticed a decided increase in the amount of tissue involved, in the past few days, following the use of an arsenite of copper tablet placed on the ulcer each day at the advice of his physician."

You see that in each of these later two, the growth is so extensive that nothing less than the mutilation practiced could have been of any help, yet there was a time when each could have been cured by a minor local operation.

I think that little series is instructive as showing the immense importance of the time element in the treatment of the tongue, though some spread much more rapidly than others.

Passing from carcinoma of the tongue, we will take up carcinoma of the lower jaw and find the same condition holds true here.

We have here a specimen with an immense carcinomatous ulcer extending from the cuspid tooth back to the pharynx, involving half of the body of the jaw, quite a bit of the cheek and the neck lymphatics. The history of the case is that almost one year ago, an ulcerated lower right second molar tooth was extracted. The tooth had been loose for awhile, had been sore for two months, but the patient believes that the tooth was not decayed. Two months later the third molar was pulled and the sore place never healed. Pain radiates down the neck and up in

front of the ear. This man was in the hands of a dentist a year before my seeing him. A sound tooth loosened without apparent cause and the tooth next to it became loose and an ulceration developed. This was nine months before operation which was performed a year ago with no recurrence to date. The possibility, however, of complete cure is very doubtful in spite of the extensive and dangerous operation and this man was fortunate in having an extremely slow growing lesion. In many, the growth in this position would have been inoperable within three months after the first tooth was extracted.

Here is a specimen that illustrates the dangers of using irritants on carcinoma; it is the lower lip, part of the upper lip, most of one cheek, the jaw and the glands of the neck. You see the carcinoma breaking through the cheek. A hard carcinoma of the lower jaw, even of considerable size, is a fairly curable disease if not irritated, but let that carcinoma be irritated and it will rapidly infiltrate distant tissue, becoming a very incurable disease.

"Last March this man had a little ulcer to the outer side of the right lower first molar. This remained stationary until a piece was cut for microscopical examination, when it grew rapidly. Silver nitrate was applied regularly and the ulcer grew with great rapidity."

That brings out two very important points in dealing with carcinoma. The use of silver nitrate is absolutely pernicious unless you go sufficiently deep to absolutely destroy the growth. The other point is, the question whether or not we shall cut into growths to get a piece of tissue for microscopic examination. Many regard taking out a piece of tissue as also very pernicious. On the other hand, I think there are very few of us who feel sufficient faith in our clinical diagnosis to subject every patient to radical operation without the aid of the microscope. I, personally, cut out a piece of every growth and get a microscopic examination of it, but try to protect the patient in two ways, by immediate cauterization of the remaining tissue to prevent lymphatic dissemination, and doing it only with the understanding that, if necessary, radical operation shall be done immediately. I believe that is a very safe course.

A very unfortunate thing happened in the case just cited.

A piece of the ulcer was cut out, but not sufficiently deep, and sent to a pathologist for examination. The report sent back was that the specimen was a squamous cell ulcer, did not show malignancy, but the section received did not include the edge or base. In cutting a piece out, it is better to remove the whole growth, if it is possible, at least, you should get a piece of the surrounding healthy tissue because it is not the growth that shows the typical picture, but the junction of the growth with the healthy tissue tells the story. The doctor did not understand the purport of the message and proceeded to use caustics. Had, immediately after the diagnostic section, the whole ulcer been thoroughly destroyed or removed with the actual cautery, this man would have been saved much suffering, deformity, expense and his chances for cure would be much better.

Here is another lower jaw with pretty nearly the whole tongue attached.

History: "First noticed swollen tongue some time ago. Thickness increased since that time. Little pain, defective speech. Tooth which was removed two weeks ago, may have injured tongue." This was a very rapidly growing tumor. It had involved the whole tongue, and, unlike other instances cited, it seems to have had no predromal period, but was rapidly malignant from the very first.

This specimen is from a man seen April 21, 1914. He gives the following history:

"Xmas, 1913, had upper tooth pulled, the wound healing except for a little lump which appeared on the gum above the cavity; lump gradually got larger until the entire side of the face was involved. Painful all the time." Had an immense carcinoma of the face and upper jaw which I removed because at that time there was a good deal of enthusiasm about the massive dose of X-Ray for the relief of cancer. It held it in check for some months, and then it started to grow over again. This man had the lump alongside the tooth when the tooth was pulled.

I wish to call attention to a diagnostic point in the loosening of a tooth that is due to a tumor. Cancer will always appear on the mucous membrane first and is observable when the tooth is pulled. On the other hand a centrally growing sarcoma will loosen a tooth with no lesion of the mucosa, but this warning

the dentists will have: instead of the socket healing, the granulations will begin to grow out of the tooth socket. It should be a warning and the granulations should be examined.

I have here a number of specimens of carcinoma of the lip which illustrate the transition from the earliest precancerous stage to the most advanced operable type, but time will not permit my taking them up in detail. Cancer of the lip is the least malignant, and will often persist for years, both in the precancerous, strictly local stage and in the fully developed type, but whether the case has persisted fifteen years and is still operable, or three months and is inoperable, the transitional stages are the same; the time required depending upon the malignancy of the growth. Especially, in connection with the lip, it must be remembered that the glands may become actively carcinomatous years after a successful local destruction of the primary growth; I have seen this occur after eight years.

Before closing this subject of carcinoma, I want to call attention to one more symptom which is of value—that is pain. The pain may be in the lesion, in the ear or in the vertex. When a patient is referred to you for pain about the mouth, do not forget the possibility of carcinoma. We were once able to make an early diagnosis of carcinoma in the upper jaw simply from the pain. This case was sent in for a neuralgia injection, but the character of the pain led to a search for its source, which was found in the antrum.

I can tell of another case in which we were not so fortunate. a man was sent from the medical clinic of the Washington University with a pain in his ear. I looked in his mouth and found no cause for it, so made an injection in the third division. Five or six months after he came back complaining of the pain and we found a carcinoma far back under his tongue. There was a little, deep fissure to be seen on raising the organ. I firmly believe that the pain preceded a demonstrable carcinoma. Butlin reports a case where there was pain under the tongue for eight months before a carcinoma appeared. John B. Murphy had another such case.

I have here, besides the ones already presented, a number of specimens of other types of mouth tumors which I had intended to show, but the time is getting late and I will close with a few

words about sarcomata, the malignant connective tissue tumors, and myelomata, a non-malignant type of tumor, which is not uncommon and which, owing to its frequently being confounded with sarcoma, has often led to unnecessary mutilation of the jaws.

I think the place to start is with epulis, which leads us into our subject. Until rather recently, an epulis meant any lump above the gum, but now an epulis has a different meaning. It may be a fibrous tumor growing on the surface of the gum, hard and with the mucous membrane little discolored. This is a fibrous non-malignant epulis. The other kind is the soft epulis which grows from without the bone, is soft, is dark in color and rises as a papilloma. That is a giant celled tumor, which has been called a myeloma or giant cell sarcoma. Calling it a giant cell sarcoma is unfortunate because in very few cases are those giant celled tumors malignant.

Those two classes of tumors, the fibrous epulis and the giant cell epulis, no matter how much it may have extended down into the jaw, are not malignant, and only require scraping out of the tumor with the removal of part of the bone in which they grow for their cure. I think Gilmer has done much good in this regard by the little article in the *Journal of the A. M. A.*, calling attention to the ruthless mutilation that has been done in the treating of these tumors.

The myeloma may extend deeply into, or arise in, and cause expansion of the bone, but does not warrant the removal of the jaw. Sarcoma of the jaw, on the other hand, may arise in the bone or on the surface, but in either case is treated by free excision.

Sarcomata of the mouth are much less common than carcinomata and, therefore, less important. Sarcomata of the tongue, lips and cheeks are extremely rare.

The point I have tried to make in this talk is the importance of early, exact diagnosis of every lesion arising in and about the mouth, and the early effective treatment of malignant or pre-malignant growths.

SUGGESTIONS FOR MAKING THE DENTAL STUDENT
A BETTER STUDENT DENTIST.*

BY ARTHUR D. BLACK, A. M., M. D., D. D. S., CHICAGO, ILL.

Study is the basis of professional progress. The preparation of this paper was undertaken with the special object of presenting a criticism of the work of our dental schools, and of making suggestions pointing toward the development of better students, both before and after graduation. It is our duty to first pay our respects to those men, from Hayden and Harris down to the present day, who have contributed to the wonderful progress which has been made in dental education. Therefore, while we shall today suggest the abandonment of certain methods in vogue for many years, this is done, not as a reflection upon the men of the past, but rather as a compliment to their work in preparing the foundation which today makes further advance possible.

The dental practitioner of today is, with a few exceptions, the product of our present system of education. May we not scrutinize him, and find some basis for changes in school methods which will tend to make the future practitioner more what we would wish him to be? May we include in this study a consideration of the newer problems which confront the dentist of today? What indication is there in these for changes in methods of teaching?

An almost world-wide propaganda on oral hygiene has increased enormously the demand for dental service. The outcry of Hunter against opal sepsis has brought the medical profession to a realization that mouth conditions are responsible for many serious secondary lesions, together with a demand for dental service of a higher type, which requires men of broader and better education. In considering the principal objective which our schools should have—of preparing men to best serve the dental needs of our people—we are confronted with the urgent need for more dentists and an almost imperative demand for better educated men. In determining upon the course to be

* Read before American Institute of Dental Teachers, Ann Arbor, Mich., 1915.

pursued, we should not overlook the fact that the men graduated today must not only meet the problems which now confront dentistry, but also solve those more intricate questions which are certain to present in future years.

[We must realize that the dentist graduated today without having been taught to study, will not be equipped to keep pace with the progress of events; he will be no better dentist ten, fifteen or twenty years hence than he is the day he graduates, and I fear that many will retrograde rather than progress. The development of the habit of study is the most important training that can be given in the dental college course. It is of much less importance *what* a man learns in dental school than *how* he learns. If we could teach all of our students how to study, it would not make very much difference what they knew of dentistry when they graduated, as they would be so trained that they could master the problems which confronted them .

Our present graduates are generally not the type that can handle problems of the future with the greatest credit to the profession. Our dental schools have now about recovered in the number of students from the advanced requirements established in 1907. Are we to answer the call for an increased number of graduates of the present type or shall we undertake, at some reduction for a time in the number, to prepare men who will be more nearly able and more inclined to develop a dental service which will best protect the health of our people and win for us the confidence of the medical profession?

The startling revelations of the past few years establishing the interdependence of mouth and general systemic conditions, have served to impress prominently the need for dentists of broader education. We certainly should have the same mental grasp of the activities of the human organism in health and disease as do the men practicing many of the other specialties. The dental profession is today unable to comprehend the studies of medical men as they relate to our special branch which appear in the literature of the past few years, because they have not had the training in study necessary for this purpose. There is ample evidence of a lack of ability to select and use the essential facts in dental literature, without considering the more complex problems involving the dental field with which the medical profession is now

so much concerned. These require a broader and more thorough knowledge of the foundation studies upon which medicine rests. According to announcements of our various dental schools, we are teaching these subjects, but we must admit that the dental student has not been sufficiently impressed with his need for this knowledge after he graduates.

We must develop a new type of dentist. There must be a new dentistry, just the same as there has been in process of development a new medicine. The new dentist must be essentially and especially a man who thinks; whose principal service will be mental, rather than mechanical. The most important change in our teaching must be that which will train our men to think, to study, to analyze, to compare and to draw proper deductions.

There are presented two lines for improvement:

1. In the men who enter the schools, controlled by the entrance requirement and its enforcement.
2. In the training during the school course.

There is no argument of the general proposition that the better educated the man before he enters the professional school, the better student will he be. Men with a full college training would, undoubtedly, be preferable to men who have had only a high school education. In whatever proportion college training might be added to the entrance requirement, will the type of student be improved. Unfortunately conditions seem to be such that it is impractical to advance our entrance requirement to even one year of college work at the present time, as the reduction in the number of students would be too great. A closer definition of the present entrance requirement, with certain units specified as obligatory, together with a more rigid enforcement, will improve the general average of matriculants.

It is fair to presume that we are getting a different type of high school graduate in the dental school as compared with those who enter the medical school. The medical students are as a class men who are anticipating a considerable book training, while those who choose dentistry are more mechanically inclined, and look with disfavor upon those courses which require long hours with text books. That is, in a large measure, due to the influence of present dental practitioners. Those who commonly advise the young man to go to dental school, also impress very strongly upon him the utter

foolishness of spending several hundreds of hours in the study of anatomy, histology, chemistry, general pathology, etc. Not until the rank and file of the dental profession have come to realize the need of the broader education will the majority of matriculants in dental schools come without prejudice against such studies. Therefore, we should use our influence at every opportunity to change the attitude of the profession in this respect. It would seem that the type of man who presents at the dental threshold is not susceptible of a sudden change, but that he can only be improved very gradually as a natural process of evolution.

If it is necessary that we continue with the present entrance requirement, we may improve the school product by more effective teaching, by lengthening the course, or by both. Teaching may be made more effective as the teachers are more interested and earnest in the work assigned to them. There is, doubtless, room for much improvement in every school in this respect.

The most important change herein suggested is the substitution of a recitation system of teaching for the present lecture and quiz plan. The larger the school, the more beneficial will be the change, yet it seems to be the most needed change for all schools. The possibility of such a plan has come to us only within the past few years as the number and quality of our text books for dental subjects have increased. The recitation plan is necessarily based on text books for each branch which cover the subject in a manner satisfactory to the head of the department; so that he may consider the students' knowledge of the subject sufficient for the school requirement when the contents of the book have been reasonably well mastered.

Then for all schools, no matter what the number of students, each class should be divided into sections of twenty or twenty-five, and instead of lectures, an equal number of recitation hours should be scheduled for each section. The course for the entire year should be definitely planned, the subject being divided into the proper number of hours. Accurate records should be kept of both the attendance and recitations of each student, and promotion should be based principally on this record. A series of written quizzes and mid-term and final examinations should supplement the recitations.

Under the *present* lecture and quiz system, the student may

learn little or much as he may be inclined, and yet pass the examinations by a few days of cramming, possibly with only quiz compends. In a quiz of an entire class of fifty or more the chance of not being called upon will be taken by most students too often for their own good. Real study, if we may call it such, is likely to be limited to a few weeks of each year.

Under the recitation plan, with sections of twenty or twenty-five men, each student will be practically certain beforehand that he will be called upon at every recitation hour. He also knows that promotion depends on his attendance and recitation record, consequently he must be with his books practically every evening if he is to earn promotion.

The most important advantage of this change should be the effect in developing the future student dentist. If a man is trained during three or four years to get his knowledge from books; to spend his evenings with them, to have them for his constant companions, instead of having all of his information poured in from a rostrum, or crammed in under examination pressure, he will have learned to depend on books, and will be more likely to use them in the future.

The substitution of this recitation plan by the small school presents few difficulties. The larger the school, the greater is the problem of securing qualified teachers. In the larger schools it would probably be out of the question for most teachers to increase the time devoted to school work sufficiently to hear each section personally. They would, necessarily, superintend the teaching and rely upon associates to assist with the recitations. However, it seems likely that we might attract a better class of men for this service than has generally been possible for demonstrators, as the hours need conflict very little with office practice. One could hear two recitations before ten or ten-thirty in the morning, or after three-thirty or four o'clock in the afternoon, and the college connection, together with the remuneration which might be paid, should be sufficient to attract good men. For foundation branches, it is probable that a considerable number of senior medical students or recent medical graduates would serve very satisfactorily.

This change is suggested with a full appreciation of the magnetism and eloquence of a limited number of men who seem to have been created with the ability to command and hold the atten-

tion of an audience under almost any conditions. A school should not deprive its students of the valuable teaching of such a man, but let not too many of us think that we have this power. Neither is it desirable that a class, as such, should lose its identity. A schedule may be so arranged that the bulk of the teaching will be by recitation in small sections, yet permit of lectures to the entire class as may seem desirable in each subject. The determination in this should be based on the conditions surrounding each subject in the particular school. In some subjects one lecture a month might be given, in others no lectures at all. Some subjects may be best taught almost entirely in the laboratory. As a general rule, however, the head of the department should meet one section of the class, while his associates meet other sections, and there should be a regular progression, so that each student would have an equal number of hours with each teacher.

There is another very advantageous feature of this plan: That there would be one or several men in training in each department who would have earned promotion when a vacancy might present.

The same principle should be applied to laboratory instruction, the sections being as small as can be arranged. A thoroughly equipped laboratory, which will accommodate a small section, will afford the opportunity for more effective instruction than will be possible with a large section, even though the number of instructors be in the same proportion to the number of students.

The sectional plan in both recitation and laboratory permits the arrangement of a more elastic schedule; it also makes it possible to utilize the building space to better advantage. There may be recitations in the same subjects at different hours, or on different days, but in regular order, giving the opportunity to vary the schedule of individual students to meet unusual conditions. This would apply especially to students who transfer from one school to another, or to cases in which a student is required to repeat a single subject in which he may have failed and which might otherwise interfere with his advanced schedule. In many schools, certain large laboratories are used but two or three half days per week. With the sectional plan, the small laboratory may be in use practically all the time. It makes it possible to teach more thoroughly a larger number of students in a building of a given size, but will, undoubtedly, materially increase the cost of the instruction.

In clinical instruction, every effort should be made to secure the highest possible efficiency in team work between the head of the department, his recitation assistants, and the demonstrators. The central idea in this should be to tie everyone connected with each department to the chosen text covering clinical procedures, and to insist upon the utmost respect from teachers in all other clinical departments. Each assistant should be impressed with the necessity of subordinating his personal ideas to those of the head of the department. Such team work is absolutely essential to effective instruction. If the requirement in each clinical subject could be the completion of a certain minimum number of operations of a specified grade of excellence, without setting a maximum, the general average of quality should be materially improved.

If it were possible to have the recitation masters in clinical subjects also act as demonstrators, it would seem to be an ideal plan, but I think this will generally be found to be impracticable. While there are some very notable exceptions, the man who is willing to take as much time from his practice as would be required for both recitation and demonstrator service, would generally not be desirable.

Careful study should be made of the proper balance of technical work to study hours. The present schedules of many dental schools are entirely too heavy to give students sufficient hours for study and reflection. Much time is wasted as a result of insufficient instruction in laboratory and clinic. If the laboratories can be well equipped for small sections, with better instruction, the time now provided in the schedule may be materially reduced, while the amount and quality of work will not be diminished.

Every conceivable plan should be undertaken to interest students in independent reading; to familiarize them with dental and medical literature. Ample space should be devoted to a reading room and every effort should be made to build up a good library and museum. The student is likely to be impressed with the importance of books and study in accordance with the space and convenience provided. The leading dental journals and several of the better medical journals should be available on the library tables. Students should not only be encouraged, but required to do reading outside of the regular school courses. Several chairs may call for short theses on assigned subjects. This year our former short course

of lectures on dental history has been expanded into a lecture a week during one semester on dental literature and history, in which the writings on various subjects, as well as the contributions of selected men, will be reviewed. This is a new feature which we believe to be very much worth while.

It seems to be the consensus of opinion that dental schools will require a four-year course in the near future. There is much diversity of opinion as to the best curriculum for such a course. This is due, in considerable part, to the conditions in which each school finds itself. A few seem to desire the addition of a full college year to precede the present dental course, while many prefer the addition to the present course of a full year in dental subjects. I will present the view of the faculty of which I am a member, with the expectation that other plans will be presented in the discussion.

Our preference lies in what, for want of a better name, we have called the split course, to consist of a four-year dental course, into the first two years of which will be incorporated the studies of the first year of the College of Liberal Arts.

Under this plan we would accept students for a four-year dental course, with the present preliminary qualification of high school graduation. Freshmen would spend four half days each week in the College of Liberal Arts, and would have English and mathematics (or a science) as their principal studies. In the dental school they would devote the remainder of their time to basic studies for medicine and dentistry, with one dental technical subject, such as a recitation and laboratory period in operative or prosthetic technics.

Sophomores would also spend four half days each week in the College of Liberal Arts, taking a language and a science as their principal studies. In the dental school the basic studies would be for the most part completed, and a single technical recitation and laboratory course in dentistry would be given.

The Junior and Senior years would be much the same as at present.

Stated differently, the freshman year of the present three-year course would be divided, and half of it would be given in the freshman and half in the sophomore year. The freshman year of the College of Liberal Arts would be similarly divided and the dental

students would take half of it during their freshman and half during their sophomore year. There seems to be several points of advantage in this plan. The dental student would have training by the teachers and association with the students in the department of liberal arts during two years and would complete the full freshman requirement in the college. During both years he would receive training in dental technic and would thus be developing in finger skill. This feature would be a distinct advantage of this plan over that in which a year of college might be required for entrance. The time now devoted to basic studies could be extended sufficiently to materially increase the teaching of these, making them closely, if not fully parallel, with the same courses in the Medical School.

It is believed that the plan suggested for the first two years will eliminate a number of students now entering dental schools, because they would find the study requirement too heavy or incompatible with their preconceived ideas that dentistry is mostly mechanical. The men who will satisfactorily complete these two years will, as a result of this training, approach the more strictly dental subjects of the following years with the expectation that much study will be required; they will have learned to depend on books in school work and will be more likely to do so in future practice.

The expansion of the present dental course over four years would tend to bring about little change in the type of student or in his viewpoint of the dental school and the profession. If we can not have a different type of matriculant, he must undergo a metamorphosis during the dental course, and it is felt that the year of college given as a part of the dental course, will be even more advantageous than a year of college as a preliminary requirement.

It seems hardly necessary to mention the fact that there would be little reduction in the number of students under this plan—the entrance requirement being the same as now—as compared with the proposition of requiring a year of college preceding the dental course.

As has been suggested, the conditions confronting each school will modify the course which it will prefer. The split course proposed, will be more acceptable to a dental school situated on the same campus with a liberal arts department, than to a dental school situated possibly in a different city, or having no university

connection. It is believed that most schools could arrange to meet such requirement without too much inconvenience to their students.

It is hardly within the scope of this paper to discuss regulations, but there is such a close relationship between schedule and the regulation or law which may govern some of the schools in the near future that a suggestion may not be out of place. A four-year dental course should be required, which will specify a schedule of a minimum number of hours for each of the various subjects, also that a certain minimum number of these hours or subjects must be given during each of the four years. Such a rule would give each school some latitude in the matter of adding strictly dental or liberal arts courses to the present schedule.

We should look forward to the day when dentistry will become in the fullest sense a specialty of medicine. It seems very probable that there will be a change in medical instruction by which a definite general course will be required previous to schools or courses in each specialty. It is to be hoped that by the time of such change the teaching of the basic studies in our dental schools will be so nearly the equal of that in medical schools that we can discontinue the teaching of these studies in dental schools and stand with the other specialty schools ready to receive all of our students from among those who have had the general medical training. We will then have better dental students and better student dentists.

A DENTAL CRITIQUE, WITH SOME SUGGESTIONS.*

BY DR. BERNARD J. CIGRAND, BATAVIA, ILL.

To be invited as the guest of the dentists of the north-central part of Illinois, including four of our most prosperous counties of this state, is indeed a compliment one may well be proud of; this is the third time that you have shown me this consideration, and the beautiful city of Rockford has been the place of these meetings. Your president, as well as the chairman of the programme committee, said: "We are looking for a practical paper, and we have selected you to fill the want."

* Read at Winnebago or Rockford District Dental Society, March 27, 1915.

That sounds friendly, indeed, and it will be my earnest effort to fractionally comply with your request, and I shall give the paper in the form of a critique, which need not necessarily be condemning in spirit, and bring to your attention a score of items which have a practical bearing on our personal and our professional success, and while there are elements to which I refer which may seem severely dealt with, you will agree with me in that he who praises a wrong and permits it to repeat itself is far more dangerous to a community than he who in a kindly way hopes to correct the errors and firmly admonishes against practices of deteriorating influences which lead to eventual failure. And, kind friends, this will be the thought I hold most high: Let us serve in the interest of higher professional standards, so humanity and we servants may be made happier.

There is a need now, more than ever, that we do not delegate a few, or that we expect only those who are so inclined, to formulate and establish the progress for tomorrow. No, a profession like ours is like a republic, all must serve, and in this community and united service there is real and not false progress. To retain our dignity we must arouse anew the young and old to study and to personally, jealously, watch every form of practice advocated. It is not sufficient to be able to make a perfect laboratory crown or bridge; there must be a comprehension of the underlying strength or the force of resistance which the oral fabric possesses, hence a case may appear to be, so far as construction is concerned, a most faultless product, and yet when placed in the mouth it fails to render that equation which leads to success. More and more must we concern ourselves with the sub-membranous or hidden structure of the mouth. Every day conservative prosthetic operators are becoming aware that the failures of today are due to disregard of a study and a comprehension of the bony, the alveolar and the tissue elements which contribute to the ultimate answer of our knowledge of prosthesis.

It has been a rule with me, both in practice and in instructional work, to recommend that a bridge requires as many anchor-roots or supporting teeth as there are substitutes missing, and to yoke, hang, couple or assemble more substitutes than there are bridge supports, will only spell failure in a very

short time. And where the roots of the teeth are inclined to be infirm in their socket attachments, I would say, for every substitute required have two roots or teeth; we must have better foundations, for regardless of how carefully you have constructed the metallic frames or how painstakingly you have been in the soldering or the baking, or how patient you have been in its polishing, all this artistic work and this employment of time will only aggravate you more when this same case comes back loose and possibly out of harmony with the remaining parts of the mouth. It is also possible that you have charged high for your work, and the case growing into a delapidated failure, your once trusting patient visits some dentist, and your ability as a judge of logical bridge construction naturally becomes a topic of discussion. Of course, the ethical dentist to whom your patient has gone cheerfully defends you as one whose work generally gives satisfaction, and in this particular case you, like other human beings, have miscalculated the work and lost the patient. Regardless of how well or friendly he may vindicate you, it is dentistry and not personality which is in the scales to be weighed. The public may not seem to understand our art or our science; they may not appear to be informed of the anatomy or the pathology of the case; and they may not know much about the strain, stress or philosophy, but believe me, fellow practitioners, the public does comprehend, and to a very fine degree, when the product or result of our work has been a failure. And then excuses, arguments and even explanations will avail for little, for with the bridge in the vest pocket or in the hand-bag, all your delicate collegiate and deft analysis is superficial. The patient may have been abusive to the bridge and eaten substances which were too hard, or they may have violated your advice as to the care of this mechanism, but unless the substitute has given a reasonable service, and has met with reasonable success, you, as the practitioner, will be obliged to make reasonable allowances, do some of the work over and be the honest practitioner, or you will lose the patron, and a fellow practitioner will begin anew where you in failure left off.

Now all this waste of time, on your part, and expenditure of money on their part, can be avoided if you will never, under any circumstances, attempt an expensive piece of work unless

you are reasonably certain the substructure, the underlying osseous tissues and the membranous appearance is such as will permit of an outlay of considerable or even ordinary amount. We are all obliged to come to this conclusion, that we have been doing too much temporary work, too much of what we have claimed would be permanent and enduring has actually been tentative. Let us be honest and we will confess we have been nailing our faith to too many false gods, whose pedestals are neither of art or science, but a conglomeration of would-be logic.

Now we will never make the progress which the past generation has bequeathed unless we correct our mistakes, and in candor accept philosophy which is not only proven in the laboratory, but which must also bear the acid test, so-called, in the mouth. A table clinic may seem just right; there are visible all the elements which lead to triumph, but the actual and final laboratory after all, is the mouth. And, when a case has held up and fulfilled its calculation in the oral cavity, then and only then, can you pronounce the laboratory test perfect.

We are, just at present, drifting away, I believe, from the broad ambition of really serving in an unselfish way the great human family about us. When I read of the men who laid the foundation of our calling, and contemplate how eagerly they denied themselves the pleasures of the day in order that they might render to their suffering kin a service in dentistry, and when I review how earnestly these pioneers pursued their books and deciphered the equations of nature, and I can imagine them in their spiritual form today, admonishing us to trust little, except it be a part of experimental knowledge, I declare by all that is sacred that with this one view to my left I look with half misgiving upon the right side, where, today, in the present hour, we are chasing the dollar, forsaking the path of study, and groping about for methods, systems, practices and manners which may bring us dollars.

We may well, in our quiet, sober moments, with propriety offer up a professional prayer to lead us back to the books, back to laboratory, back to the test tube, and back to the dictionary of art, and the encyclopedia of science. Here, and only here, will be found our true guides, and as we delve into the mysteries made fascinating by the giant minds who have given us the

printed page, and those who have bequeathed the perfect pictures and solved for us so many problems, we will again get back to the path of human service and set aside that ambition for easy, comfortable and selfish service which really has, as its main spring, that policy of get-rich-quick.

No more nefarious and destructive idea can enter the mind of either the young practitioner or the elderly dental surgeon, than that he brushes aside his dental journals, the new dental volumes, or the magazines of collateral sciences. I know of nothing which will undermine him quicker, and do it more noiselessly, and apparently painlessly, than that the degrading hope of getting rich occupies his mind. This ambition seems to gnaw a hole through his conscience and permits his homespun goodness to leak out and disappear.

My advice would be, back to the books, and back to the microscope. These are the instruments which will be the pillars with which we will uphold the dignity of our profession, and make glorious the career of either the dead or now aged sanctified devotees who gave earnest, honest dental service.

The recent idea which is prevailing that you must make an appearance, your office must be just so, elaborate in decorations, comfortable in seats, chairs and lounges, with mirrors glaring at you from every angle, may appeal to some, but believe me, that your patients will soon forget your quaint, pretty and lavish reception room, when the crown comes off, or the entire dental restorations, which you have so quickly affected, have failed. In conjunction with this same false idea that you must make an appearance, the glib salesmen come and tell you that if you will buy a complete office outfit, modernize yourself, you will appear efficient; of course, I could not help employing the word "efficient," for this thread-bare term must be used to be up to and in line with the salesmen's talk.

Now, no one in the world desires more than I do that you get the best, the latest and the most efficient, but, please, do not be misled, and think that appearances will bring you much, or hold you any value for any length of time, unless you can with your brain and hand deliver the real results, for it is results, and satisfactory results, which the patrons desire. They care nothing for your office fixtures, nor your reception room

comforts, much less your lodge connections or church affiliations. All they wish is that you perform serviceable, logical dental operations in their mouths.

They care little whether your office is in the First National Bank Building, they do not consider whether you are on the first floor, basement, or suite on the tenth floor. What they are really after, is a dentist who understands the practice of dentistry, and if he has his office on a side street or out of town, that will not materially affect the decision if they are seeking products which will give them service and comfort.

Hence, read your journals, study your books, visit your societies, experiment in your laboratories, and make the microscope, and the test tube a part of these companionable things, and you will, in the eveningtime of your professional career, have satisfied yourself and been a blessing to mankind.

To follow out some of these suggestions will possibly tend to disturb your financial progress for some months, or even for years, but you will finally and maybe soon, revamp your miniature treasury, and you will have acquired a general practice which will redound to your good name, and bring you money.

To be able to so conduct your practice as will bring to you a mental satisfaction of having done that which you positively know is right, that kind of policy is to a profession, what statesmanship is to a country.

When you are about to determine whether a root may carry a porcelain crown and you discern by the eyes of the exploring instrument that its sides are devoured by pathogenic life, and that the alveolar process has been eaten away by one of a hundred different things, and you well know that the bony surroundings are gone, and that its position in the mouth is daily becoming more and more a foreign body,—why hesitate to tell the patient that it would be unwise to attempt to save the root, and that a crown is contra-indicated. Figures I and II. They will naturally say a few things, and possibly ask a few questions. Well, be calm—be a cool-headed listener, and answer the queries in a soft, convincing and professional way. The time you give your patients in this courteous and instructional manner, is never lost; you are really making good money, being a gentle-

man, and replying in a compensating fashion. The patron will soon learn without your telling it in so many words, that you know your business, and should the patient seem dissatisfied with your decision and remark,—“Well, last Thursday I called and consulted Dr. Blank, and he advised that he could save the root and put on the crown, but his price was a trifle too high, and so I came to you, believing you might be more reasonable.” Here is the stream most dentists fall into, when crossing; here is where they lose their heads, and fall down and drown. My advice would be to keep calm, and add words like these: “Dr. Blank was certainly anxious to save the root and I am pleased to learn that his fee was so high, but really, I would rather lose your patronage now, and have you come to me after you have found my present judgment correct.” This impresses them with the firm business stand which you have taken, and they will generally climax the talk with—“Well, Doctor, what would you suggest should be done, and how would you proceed to fix up my case?”

You have crossed the stream by going over the bridge, and your patient now respects you for being a worthy representative of your calling. This same idea holds true in thousands of other situations of a similar character. It may be applied to every form of filling, and is alike in all our relations between patron and ethical dentist.

People in the future will be obliged to pay more for dental services for the dentist will also be obliged to have better and more fundamental knowledge about his work; there is going to be less guess work; less of the Southern expression—“I reckon.” We are obliged to get to the basis of dental practice and this will mean that we know quite definitely what will and what will not lead to success.

The latter remark brings me to say that the Roentgen Ray in the days to come will be our greatest aid in determining whether a root or a tooth or a bridge is in harmony with the remainder of the oral economy. This may mean that your patient must of necessity journey to a nearby dental or medical studio, where men of reliable scientific education and dental training are employed, either by the state, the dental societies or by the Federal Government.

Whatever may be the paying or controlling factor in such a serviceable Roentgen Laboratory, the fact is, this superficial method which we now rely upon, must soon give way to the scientific and to the reliable. If your patient is not sent to such a place for determining difficult dental equations, it will be your duty to become familiar with this problem by taking instructions in this field of work, and installing the photographic lenses and developmental apparatus, so you can render that service as shall be in keeping with medical science and dental art.

Of course, there are cases which you can, with propriety, send to the so-called specialist, but I surely would advise against sending a single case of any kind out of my office, unless I felt that the patron sent to the expert would receive honest, fair and commendable service. These experts in no small number of cases charge fabulous prices, and render operative services which can be called charlatanic, because they take the patron's money, knowing full well that the so-called permanent cure which they are promising is a myth.

Everywhere you go, you hear about the unprofessional manner in which so-called experts are treating, curing and effecting life-long health in pyorrhea cases. I have in mind a case where a conscientious dentist believing he would serve the patient better, recommended her to visit a pyorrhea expert in a big city, and after the patient paid several hundred dollars was obliged to go to an expert ex-odontist, and have the diseased teeth extracted. Now what opinion would this patron entertain of her old family dentist? What opinion would she have of the so-called expert? Let me say to you, that she would quite likely think that her old family dentist got a handsome rake-off or rebate, and the entire transaction in her mind would be registered as a clear case of graft, and for lack of a better term, let us candidly and boldly call it G-R-A-F-T, with a capital "G".

If you cannot give your patients better advice than to arrange for them to lose their money and their teeth, I would advise that you treat the teeth yourself as best you can, and if no definite improvement registers itself, extract the distressing roots or teeth, and let "all-knowing nature" affect the cure. We are trying to save too many loose and diseased teeth, which, for the welfare of the patient, as well as the standing of our profession, would be better

to rid the mouth of the germ-breeding, life-destroying circumstances, which we, in our ignorance, are falsely hoping to restore. That mouth which is filled with pus-belching pyorrhea pockets and which has here and there individual crowns, the roots of which are wearing upon the apex, cysts, ulcerations and open channels of flowing waste tissue, is a menace to that person's health, and the quicker some conscientious dentist gets the case, and restores the mouth, either by proper prosthetic and medicinal dentistry or extracts such distressing teeth, the better will it be for not only that patient but the entire community. For years, I too, was of the army of dentists, who hoped and attempted to save all roots, all teeth where there was still the slightest apparent hope for salvation. Study and observation has since taught me that where a root or tooth is no longer encased by alveolar structure, and where the surrounding tissues indicate a chronic wasting, I propose extracting. I free the patient from the constant worry of dental attention and the relief of this, in itself, is a tonic; besides I have put out the fires of inflammation, and permitted nature to act as the supreme physician, which she invariably is notwithstanding our claim of superiority.

In such cases where the teeth indicate a pyhorrea tendency, I seldom resort to placing large bridges for in this case the teeth and the roots will be wobbly, changeable in position and in this shifting and lack of stability, the cement can never hold the attachment and immediate failure is certain to result. In these cases a partial removal bridge where the force of mastication rests on the gums rather than on the weak teeth or crowned roots, is the logical and wise way to serve the patron. Figure IV.

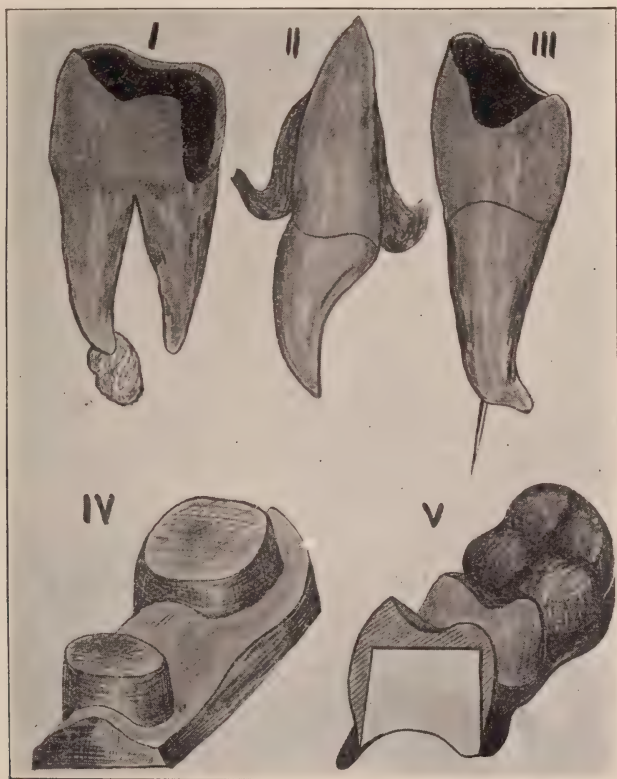
We must make fewer bridges and have these placed on foundations which are solid and which are surrounded by healthy tissue, both the osseous and the vascular, and then with this newer and safer practice we will restore the public confidence which in present floundering, failing methods only degrades our professional standing. Figure V.

Clasp cases, too, are certain to become more the appliance in the future, where bridgework, because of weak fundamentals, is not indicated. The method of making the clasp partial case will be the theme of tomorrow; it is still in process of perfection, but be assured that the careful clasp, wide, well fitting and congenially placed, will be considerably in use in the days to

come. The clasp method, too, admits of allowing the patient to keep the oral cavity clean and unobstructed by foreign matter.

FIGURE VI

While I am discussing the subject of loose teeth and weak rooted teeth, permit me to call attention to the illogical systems of pyorrhea treatment which institutes a drastic scraping and scratching of the peridental membrane; that expert who



gouges down and cuts away all the connecting, living membranes which feed the root and leaves the root in the socket trimmed, smoothened and bereft of all its surrounding dental cellular tissue, has permitted a foreign substance to remain in the jaw, and nature will cast the tooth aside as the patient will cast the dentist aside in a very brief period. They say, well, you have allowed the patient to retain the tooth for a year or

more, also, if the patient dies within fourteen months you have saved the tooth during the remainder of life. But some of our patients live just long enough to see the folly of such practice, and later they may even drift into an advertising parlor and get a square deal. Such things happen only too often. Now, the pyorrheal treatment of the future is going to be one more kind than you can give with the scraper, the scratcher



and the scarrer; the hatchet and the chisel and the hoe have their place, but pyorrhea will be treated more by the method of proper eating, careful cleansing of the body, both external and internal, and soothing, restoring and rehabilitating methods will be resorted to and the recent practice of employing something after the emetine treatment will be the most rational. My experience along those latter lines has led me to have great faith

in less heroic surgery and more congenial foods and medications. Purity of body and elimination of poison before it reaches the mouth is the preventive method which will deserve your study. The injection of emetin which is calculated to destroy the poison of either the bacteria or the destructive processes of their elimination, will claim our closest attention. The phagocytic powers of cells and the function of travelling leucocytic cells, these minute and still little understood elements of the human body, merit our closest study and observation.

Just because some prominent man of the profession says that this or that is correct, does not necessarily mean that it is the truth; take his suggestion, respect his deductions, but make yourself familiar with its underlying logic, philosophy, art or science; you have sufficient knowledge in all the basic studies of dentistry to easily acquaint yourself with the facts, and thus study the leader's statements. It does not pay to institute too many innovations in your practice, regardless of who suggests the change, unless you are personally familiar with the entire method and are capable of translating his suggestions into applicable practice. Too often we see men enthusiastically practicing a system, method or policy which the original suggestor would with all his experience and capacity, refuse to attempt. But here as in other walks of life, "Some would venture in where angels fear to tread."

Nor would I have you understand that I wish you to follow all the suggestions and turn your eyes to the trend I have pointed, nor give all your ear to all I speak, without trying out, observing, experimenting and deducing in your own laboratory and under your own microscopic lenses what I have here brought for your consideration. But if you will give the same years of attention, devote the same hours of study to the thought and compare unbiasedly, you will in your conclusions be in close proximity with what I have here offered you. In other words, go to your meetings and do not accept too readily what any man says, regardless if he be editor, dean, professor or specialist, without weighing it carefully on your individual scale of experience and without familiarizing yourself with its truths and with its inaccuracies, for it is this blind, unthinking acceptance, and this enthusiastic adoption without heeding the admonish-

ments which often cause the profession to cast aside an otherwise useful and serviceable method or system, just because too eager application where it never was intended, became the fad of the hour.

Gold inlays have a place, and indeed a very emphatic place, in practice today, but the idea of a practitioner saying, "I have sold my entire instruments and appliances for inserting gold foil, I have practically forgotten how to put in a gold foil filling."

This form of an inlay enthusiast, would make honest practitioners blush, yet such is the talk you can hear in the hotel rotunda of dental meetings. Why a superintendent of a dental laboratory in Chicago recently informed me that he frequently receives wax impressions for gold inlays, which would not cover the head of a pin. Just why men lose sight of good, acceptable methods and crowd in and push to the extreme, some favorite or popular system, I am unable to say. The small gold filling size of the circumference of the lead in a pencil, can still be placed in the cavity by the mallet and gold leaf. At a clinic a contact decay was made a proximo-occlusal inlay. Figure VII.

"Back to the soil," they cry in the cramped, crowded and congested city, where hunger is in fashion and where crime has plenty of companionship, and while "Back to the soil," really means "go to the country, the farm, if you please," so in the midst of inlay enthusiasm where some are debauching the earnest professional intent, and where others are cutting, slashing, grinding and splitting away good tooth structure, so they may place an inlay—to these,—sometime there will be a voice, like unto that which came from the wilderness "back to the foil," which shall mean—go use your mallet and insert the leaf of gold.

That we are still in the woods about so-called settled questions, let us be certain, beyond the shadow of a doubt. Dentistry has yet a long way to travel, to be accepted in major, as a science which means that it is classified and accurate knowledge. The innumerable theories about root canal fillings, the cause of caries, and structure of the tooth, whether the tube contain nerve energy, or whether the spaces of apposition of these tubuli possess neutral powers, as well as the very structure of the alveolus, requires more light, and this you should assist in giving, and not be waiting for some other studious practitioner

to kindly and without even thanks, turn over to you. Figure XII.

That the future must bring radical changes in our methods of practice as they relate to both preventive and clinical procedures, any one must realize who, watching the shifting, changing flood of the maelstrom of our profession. And, unless we individually assume some of this burden of correction, the fair name of American dentistry will surely fade from our midst and some more earnest, delving, seeking, searching people will reap that reward which comes to those who seeketh.

And in the hope that you here with the prosperous community about the city of Rockford, may be encouraged in your independent, yet collateral work of raising the standard may not be lagging, I have urged these observations, knowing that among friends as dear as you all are, my critique, may serve as a stimulus, to go on and assist in deciphering the messages of nature as found in the oral cavity.

So that you may further comprehend my liberality in announcing my opinion as to things which should be changed and items which must be taken into consideration, I will say that in my varied experiments which I am always pleased to have in tow, I bring to you diagrams, specimens, and models to illustrate various processes under my personal supervision.

The Double, or Inter-locked inlay, I employ where the tooth is decayed on three surfaces, and where I fit one inlay into the other inlay, in such a manner as will restore the usefulness of the tooth and thus prevent the employment of the crown which always should be the last resort in prosthesis. Figure VIII

A molar or bicuspid can often be restored by this dual inlay and you need not make both inlays of gold,—one may be of porcelain, or both of gold or porcelain. By this method, too, you need not destroy so much good tooth structure, as where you would hope to restore the several decays by one large inlay. The complex gingival cavities can also be compounded in a like way.

In inlays in occlusal or labial or buccal cases, where the inlay is entirely encased with tooth structure or encircled with a complete dental wall, I do not employ cement, but set the inlay with white rosin. Place powdered rosin in the cavity, heat the metal inlay or with heated burnisher you can also melt the

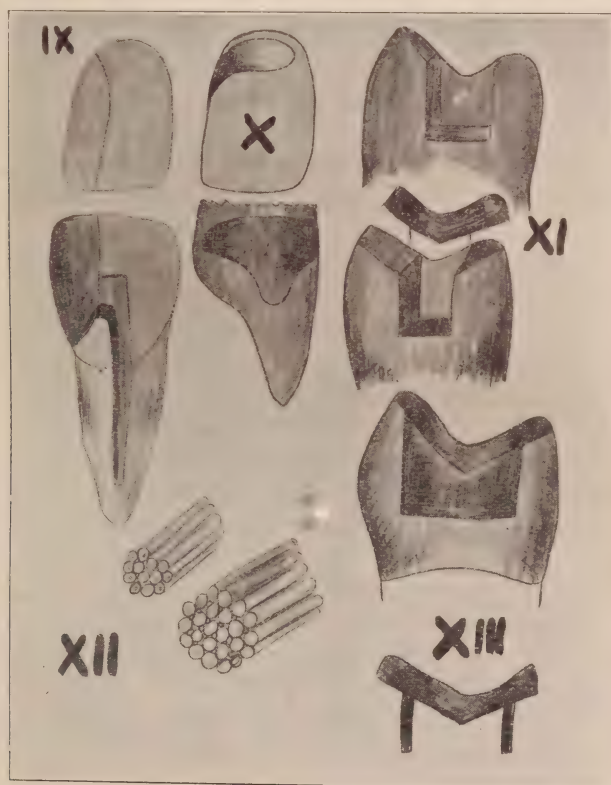
rosin and quickly lodge the inlay and you have safely anchored the inlay by a material more congenial to tooth structure than cement. Figure X.

It may seem like useless practice but I have in a number of cases made it possible to adapt the metal of the inlay tightly against the wall of the tooth and thus burnished the metal against the surface thus protecting the tooth structure against decay giving a burnished pan and then fitting the inlay. This method I gave at a clinic in Chicago about eight years ago but in the enthusiasm of the direct cast inlay, it was not generally understood. I make a swaged inlay matrix of pure gold of a gauge thin enough to insure that it will become absolutely adapted to the cavity and then I follow up with another swage of thin gold with the grain crossed over the first swage and with small burnisher I accurately adapt the double matrix to the wall and when I have it about perfect—there can only be approximate human perfection—I remove the second swage and with rosin or very thin well mixed cement I fasten the matrix into the cavity burnishing it home and with rubber compress hold the gold in the cavity. I now have a gold lined cavity and when the cement has hardened, I proceed to take impression of the gold lined cavity and make the cast inlay in the general and usual manner and when trimmed, cement it into the gold lined cavity. I now have a gold inlay with burnished margins hugging closely the walls of the cavity. When all has dried and set I proceed to grind or paper disk the two forms of gold and the dental restoration is, I believe nearer correct and more likely to save the tooth and prevent secondary decay, than by the mere inserting of the cast inlay. Figure XVIII.

Often times practitioners find it difficult to mallet a gold filling into a rather loose or delicate tooth and a gold inlay then seems to be the process indicated, but if the cavity is formed for the gold foil filling and the rubber dam is carefully adjusted you can easily give additional support to the tooth you are about to fill by placing a small amount of softened modelling compound about the tooth or if it be a central or lateral you may place it behind or on the palatal surface and the tooth will be held firm and can easily resist the blow of the mallet.

The adjusting of the rubber dam too may be of consequence,

and it is not always necessary to place five or more teeth through the dam, when only a single tooth requires filling. You can make an oblong opening in the rubber dam and after applying iodine to the gums stretch the dam across four or five teeth and thus avoid tying up the intermediate ones and saving your patient considerable pain and possibly periodontal inflammation and threatening the teeth with pyorrhea, because of the injury to the gums by severely and tightly tying the silk ligature.



Again I have practically discarded the use of all sharp jawed rubber dam clamps, which grapple the tooth and with their sharp jaws injure the tooth, and thus cause the tooth to decay where the deep scratch has penetrated. I take these same clamps, dull the teeth on them and slip a thin rubber tube over them and by this means these sharp prongs do not come in contact

with the tooth structure and besides the rubber covering assists the clamp from sliding or pulling away.

My method for avoiding the worrying phases of extracting an impacted molar is to gradually crowd the disturbing tooth away from its neighbor by means of a small piece of rubber dam; in a day or so I can place a larger piece of rubber, possibly a band of twenty-two gauge and follow up with thicker pieces and finally applying a thick pledget of cotton and get space permitting of easy and riskless extraction. These few days of preparatory treatment are better than a week's treatment of post operation injuries by the old method.

In bridge work I am gradually employing a method which admits of anchoring a bridge without the terrible torture of grinding and trimming down the occlusal surfaces of bicusps and molars; and this also allows me to leave the articulating surfaces undisturbed by anchoring the case lingually, palatally, and distally leaving the occlusal surfaces untouched and exposed for mastication.

There is another item in this practice which will astonish you, the details of which I soon will give to a Michigan Dental Society, namely a tooth requires sunlight and air, and the reason why teeth which are entirely encapsuled with gold, suffer death of the pulp is according to my observation because they have had sunlight and air shut out and the pulp dies as a result of this denial of free oxygen and solar influence. I will briefly demonstrate this, but must leave the full explanation to the society having my promised paper.

When vulcanizing a case where the rubber is to be rather thick there are two difficulties, first there is a likelihood of porosity and besides the plate will be very heavy. In these cases during the packing period just place small pieces of aluminum in between the rubber packing and the case will not be porous and besides you make the case lighter.

In soldering you often have trouble in having the solder flow where you wish it, but if you will buy what they call extension lead pencil, it admits of extending the lead fully an inch or more and you can hold the metallic end and with the point of lead direct and ply or push the molten mass where you wish it and it will follow without rebelling. And if you do not wish the

solder to flow to point just take a soft lead pencil "B. B." and mark with the lead and the solder will not climb nor attach itself where the lead mark goes.

The fact that backings in porcelain bridge or crown work do not fit snug and that there is thus created a splendid harbor for bacteria in the debris which accumulates between the backing and the porcelain results in many people having a bad odor emanating from their mouth when apparently there seems no cause for it. Recently a patient came to me complaining that a disagreeable taste and odor was present in her mouth. I examined all her teeth, they seemed in the best of condition, but a central crown, a Richmond, was discovered as the offending member. Nothing would do but it must come off. I acquiesced and in replacing a well fitting porcelain I partially overcame the disagreeable objections; I then examined the Richmond carefully, removed the facing, and I cannot begin to convey to you what my microscope revealed, as to the tenants behind the porcelain. We must swage or double swage our backings or we must cast them. In the event that a badly decayed bicuspid with the occlusal surface gone, the gold inlay should not only replace the decayed surface, but the gold should be permitted to overlap to the summit of the lingual and buccal cusps, which will insure against the splitting of the tooth. Figure XIX.

Frequently the decay on the buccal surfaces of either bicuspid or molars, and the labial surfaces of the anterior teeth, extends to the gingival portion and the gums have receded, exposing considerable of the cervix of the tooth and in these cases you can make a combination inlay, using platinum matrix with low porcelain of a tinted or gum color and follow up with a gold or tooth shaded porcelain inlay. The combination will be harmonious to the gum tissue and will make the case look free from recessions. Figures XIV and XXIV.

In the event of a fractured root which was carrying a crown ream out carefully, disinfect and dry out, and then force liquid paraffin into the fracture or use liquid rosin; then with wire placed about the free end bring the parts in apposition by twisting the wire. Now take one of the two sized trephines which my system furnishes and drill a circular aperture into the free end and fit gold band as illustrated. Figure XV.

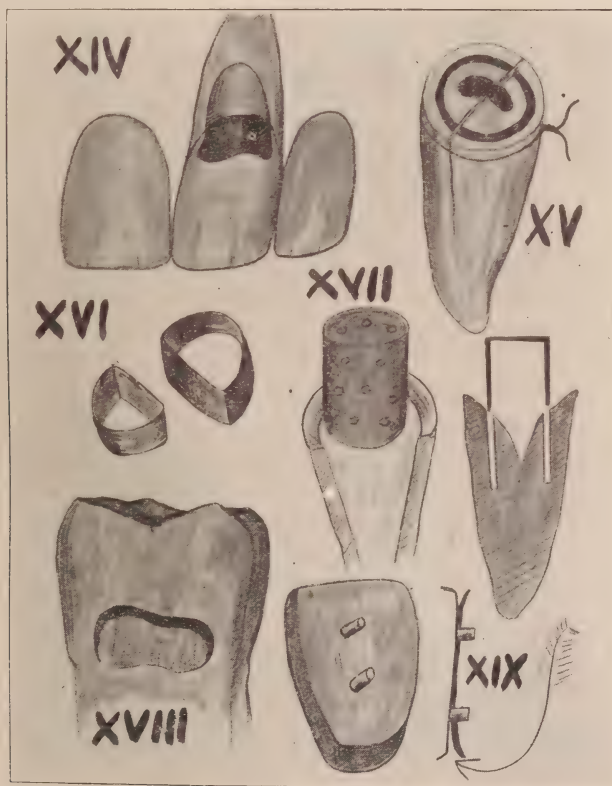
Small bridge where single tooth, say the second bicuspid (upper), is missing, cut circular apperture into the occusal surfaces of both the first bicuspid and first molar and permit the gold bands to be exposed at the side next to the missing bicuspid; now place your bicuspid with backing into position and solder the bicuspid backing to the two exposed surfaces of the two rings; when all is soldered and finished cement it into place and you will have secured the bicuspid into place without destroying the adjoining good teeth and have only slightly displayed gold. This is simple and certainly saves the patient considerable pain and makes a neat bridge in a case ordinarily causing us much trouble. Figure XVI.

In the construction of complete dentures in which the entire palate is covered, our success will depend more upon how well the case is adapted rather than how accurately it fits. If the palate and the remaining alveolar ridge were both of the same resistance or possessed the same yielding qualities why then mere fit would suffice, but inasmuch as there are here or there hard non-yielding places and at other points soft or spongy locations, we must so arrange to build our artificial palate and alveolar covering that the pressure will rest directly upon the soft portions, and when very severe stress is placed on the denture it will eventually ride or rest on even the hard parts. And as we understand this fact and arrange to respect the philosophy underlying the practice we will attain success in having the case remain in place and be a comfort and use to the patient.

Now whether you construct your artificial cases yourself or have them made at the laboratories, it remains a part of your immediate task to determine these yielding and non-yielding places and it can be made a definite art free from the general guess uncertainties by a method I have found very useful and simple. Before taking the impression carefully examine the mouth, and with the index finger determine the regions which are cushion-like and those which are hard; then take a camel's hair brush and dip into a creamy consistency of rouge paint and dab it on the zones which are hard and be sure to cover every resisting part.

Now when you take the plaster impression the rouge immediately incorporates itself in the plaster and definitely

marks the impression where you should trim it out thus admitting when the model is run that it shall be high at this place and hence when the case is completed it will be shallow at this same place, and the plate will not ride on the hard parts, but lay snug and comfortable on the cushion of oral tissues. If a finished case is to be improved just use whiting instead of rouge, and carve the case.



In a root decayed below the free margins of the gum and which still is rigid in the jaw and of a healthy condition, the easiest method for restoring this admitting of a gold crown with porcelain facing as for bridge work, is to ream out all the decay and drive the trephine into the sound structure and build up the entire case with wide gold band and cement or wide platinum band and amalgam and I have saved the root which

usually is extracted and made its healthy resisting powers carry part of a bridge. Figure XVII.

It frequently happens that occusal surfaces of molars and bicuspid are not deeply decayed, but are surface disturbed by either disease or medicines and here I trim off with stones of various grades of fineness, following up with sand paper and then I model the occusal with wax and either by the swaged or casted method restore the occusal surface. These restorations I then fasten into the tooth by means of the intra dental band system when I gave the profession some years ago and which has successfully served not only myself but hundreds of practitioners throughout the world. By this method you need not devitalize the pulp as the anchorage is about and not over or against the pulp. The anchorage may also be made by using the half circle band, the round part fitting into the natural teeth and the other side adapted to the interproximal surfaces. Figure XIII.

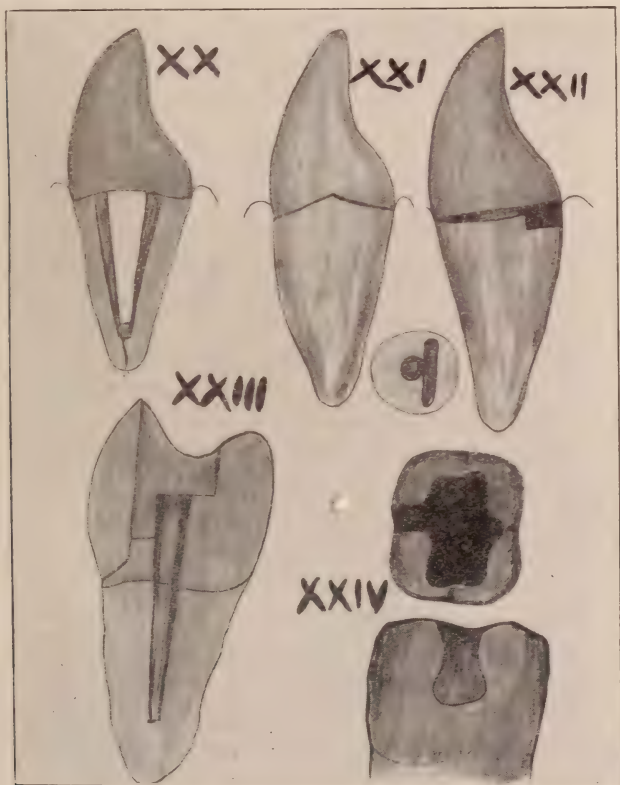
In the past ten years I have completely discarded the use of gutta percha in setting of crowns or bridges and avoid using it even in root filling as I have examined this porous, unreliable and bacteria-harboring material. Its odor when removed from a cavity or taken from the post end of a crown set with it should be sufficient warning to any practitioner that it is unfit, unreliable and useless in any manner except possibly as a temporary filling and then the term temporary should mean not to exceed a month. The microscope as well as your olfactory nerve will convince you that I am right in discarding gutta percha from the mouth.

Even cement, too, is not free from some of the objections I have just enumerated, for its porosity is an ever present danger where it is exposed to the fluids of the mouth. Under the microscope the huge caverns and channels make one think of the Mammoth Cave, Kentucky. It too is not without its shortcomings in the setting of crowns and bridges, but I have overcome this porosity and lack of resistance and made the cement more dense and compact by transforming it into a concrete which I will demonstrate to you this evening.

Practitioners still continue setting a crown with a thin, short metallic post and depend on the bulk of the cement to fill in the space in the canal, trusting that the cement will hold the crown. FIGURE XX

After a few months or years at most the cement has deteriorated

and the case or crown is loose. My method is to ream out the canal, fit the crown and post of canal length, place about the post a bit of wax and get an accurate impression of the canal, then remove, and invest in cast investment material, free the case of wax, and cast the metal about the post, and this will give you a metal post of the same circumference and length as the canal. It



will fit so absolutely that even without the aid of cement it would remain in place, but add a trifle of cement of the consistency of cream and press it into situation and you have properly anchored the crown or bridge. Cement, like glue, is not strong or durable in bulk; it must be in film form as I here describe, if you wish tenacity and durability in cement. To keep crown from tilting forward or fracturing root, I trim as in Figures XXI, and XXII, or solder a cross-bar on the post.

These are a few of the hundreds of practical points which twenty-five years of practice and teaching have proven of value to myself and others, and I sincerely recommend them to your consideration, but trust you will personally experiment and calculate when and how to apply my suggestions and with a measure of caution and a degree of careful manipulation you will learn that some of these items will possibly be of service to either you or your patrons.

PYORRHEA IN ITS MEDICAL ASPECT.*

BY DR. FRANCIS BROOK, LONDON, ENGLAND.

Mr. Chairman and Gentlemen:

I feel that my first duty is to express my appreciation of the honour you have done me in asking me to address your society today. I have chosen as the subject of my paper, "Pyorrhea in its Medical Aspects," partly because it affords a common meeting ground for us both, and partly because it is a subject in which I am personally especially interested. Dentists have for some time directed attention to the great importance of pyorrhea, but it is only recently that many members of the medical profession have awakened to the grave importance of the pyorrhea and its sequelae. Many members even of the dental profession still look on pyorrhea as an incurable disease and tell their patients that the only cure is to have the affected teeth extracted. I must say that unless it is in a very exceptional case, to give such advice as is so often done on the first interview with a patient without attempting any conservative measures is entirely wrong. I was nearly going to say criminal. My own experience is that by adequate local treatment, more especially by deep scaling, and in severe cases by treatment in addition with suitable vaccines, many, if not a majority of cases of teeth which to the old school of practitioners, it looked absolutely hopeless to attempt to conserve, can be saved by appropriate treatment. It lies with the dentists to impress the true importance of pyorrhea and the gravity of its complications, firstly on the medical profession and secondly on the public at large.

*Read before the American Dental Society of Europe, 1914.

We now come to another point. I hold that dentists like doctors owe a duty to the public beyond that of curing their immediate ills, and that is the duty of educating them in the prevention of disease. I am not asking an impossibility when I say that two minutes could well be spent whenever a new pyorrhea patient comes into the dentist's chair in explaining how dangerous a disease pyorrhea is, and how many and how serious are its complications, and how important it is that it should come under treatment in its early stages. Not only would this suggestion be of benefit to the public at large, but to the dentist also, for when patients are taught to realize the importance of the disease and to recognize it in its early stages, and to go for immediate treatment, it would be no waste of time from so low a standpoint as a purely commercial one, for every patient would act as a propagandist among his friends for his dentist's benefit.

To quote from Ayre & Payne (Proceedings Royal Society of Medicine, 1910):

"Pyorrhea-alveolaris, Caries Alveolaris Specifica, Alveolar Osteitis, Chronic Suppurative Periodontitis, Periostitis Alveolo-Dentalis, or Riggs Disease, may be defined as a chronic inflammation of the gum margins and periodontal membrane, resulting in absorption of the surrounding Alveolus. It is characterized by a persistent purulent discharge (which can be made to well up round the teeth by pressure over the sockets) and results in the loosening of the teeth situated in the affected area, and the formation of masses of granulation tissue in the interdental spaces, and finally, if unchecked causes the loss of the teeth which one by one fall out. In advanced stages of the disease constitutional symptoms are the rule."

On examining bacteriologically the organisms to be found in the pus from pyorrhea a vast number of bacteria are found, bacilli spirillae cocci and yeasts and the first difficulty is to find which organism is pathogenic in a given case, and this difficulty is the more marked inasmuch as many varieties of the organisms present will not grow artificially under laboratory conditions and on the media at our disposal.

By means of the peculiarly ingenious methods invented by Sir Allmroth Wright of taking the opsonic index, that is to say of ascertaining the quantity of antibodies present in the patient's

blood to the various germs, it has been possible to prove with certainty that the cocci are the pathogenic infecting organisms. These cocci fall into certain defined species:

Streptococcus Brevis.

Streptococcus Pyogenes Longus.

Streptococcus Lanceolatus.

Micrococcus Catarrhalis.

Staphylococcus Aureus and *Albus*.

The first of these, the *Streptococcus Brevis*, has been shown to be a harmless Saprophyte. The five remaining Cocci are well known Pathogenic organisms possessing marked Pyogenetic properties.

Ayre & Payne give the following figures in 33 cases:

Staphylococcus Aureus, 2.

Micrococcus Catarrhalis, 9.

Micrococcus Catarrhalis and *Streptococcus Pyogenes Longus*, 11.

Streptococcus Pyogenes Longus, 7.

Pneumococcus, 4.

I must say, however, that in my own work I find the streptococcus always present, and almost always the preponderating organism.

In the absence of constitutional symptoms local treatment by a competent dentist will in the majority of cases result in a cure. The question that arises is what to do with such cases as do not yield to skillful local treatment, and such cases do exist, a very few of the very acute type, but the majority of the very chronic type which has gone on for many years before coming under the dentist's care.

It is here that the bacteriologist steps in with his vaccines. I will not weary you with technical details, suffice it to say that a vaccine (Wright) is an emulsion of killed bacteria of the variety previously ascertained to be the cause of the disease. The subcutaneous injection of this emulsion causes a large quantity of the antibody for the particular germ to be formed and liberated in the body, a quantity not only sufficient for the germs injected, but for a much larger number and the surplus is used up in destroying the living bacteria present of that species. The

result obtained by these methods are eminently satisfactory and usually result in the teeth being saved.

We now come to the complications of pyorrhea. The disease is primarily in the gums and teeth sockets. Trouble may arise in two ways— (1) By the absorption of toxins and germs locally, through the sockets and gums, or (2) By the absorption of toxins after the bacteria have entered the gastro-intestinal tract, either from the stomach or the intestines. I would here point out the fallacy of the too common belief that the gastric juice is sufficiently antiseptic to kill all the bacteria reaching the stomach from the mouth. This is quite erroneous, in fact, as I shall show later, the same type of streptococci found in the pyorrhea pus can be in many cases also isolated from the faeces in persons suffering from the disease. It may be as well also to call attention to the fact that a very limited amount of trouble in the mouth may give rise to a great deal of systemic toxemia, owing to the fact that the bacteria multiply at such a great rate, one giving rise to many millions in twenty-four hours, so that even a very trivial amount of oral infection may mean an enormous number of pathogenic bacteria by the time that the intestinal contents reach the colon. A patient should never be lightly dismissed with the remark one has unfortunately heard that his pyorrhea is so slight that his general symptoms could not possibly be due to it.

To take the local absorption first I will give you a case illustrative from more than one point of view:

A well known London surgeon who had well-marked pyorrhea was playing cricket with his children. He was batting and missing the ball it struck him accidentally in the mouth, breaking off two teeth and loosening others. The trauma opened up channels for local absorption, general infection of the system followed and he died within a week of a malignant type of blood poisoning from an acute Streptococcal infection. It is a difficult matter to decide whether any given toxin is absorbed locally, or absorbed in the Gastro-Intestinal tract after swallowing, but the results are the same and the treatment identical, so that one need not enter into an academic discussion on the point. We will now trace the pus in its course after it leaves the teeth sockets. It passes first into the mouth, where it may give rise to ulcerative stomatitis, mixing here with the saliva, it flows first over the

tonsils, which it may infect with the result of acute tonsilitis and quinsy. It then passes into the pharynx and then the esophagus, where it may cause pharyngitis and esophagitis. Should any be drawn into the trachea and bronchi it may produce bronchitis, acute and chronic, and gravest of them all, pneumonia or bronchopneumonia, passing down the esophagus it next enters the stomach. Chronic indigestion is by far the commonest sequela here, but another very grave trouble may result—gastric ulcer as was pointed out by Sir Bertrand Dawson in his address last year to the British Medical Association. In the small intestine it causes chronic intestinal indigestion, and flatulence, and may infect the bile duct, giving jaundice and gall stones, etc. It then enters the caecum and the appendix. I cannot here over emphasize my view that a large majority of cases of appendicitis are due to pyorrhea and nothing else. Most of the cases, if examined, show symptoms of the disease, often of old standing, and then the same bacterium, streptococcus pyogenes longus can be isolated from the teeth and from the appendicular abscess. That is to say that had the patient been cured of his pyorrhea before his appendix became infected he would never have had the attack of appendicitis which brought him into the hands of the physician and perhaps the surgeon. Passing on into the colon we come to the subject of colitis. This disease is much more prevalent than is commonly thought. It is marked by diarrhoea more or less spasmodic, and the passage of mucus in the stools. In acute cases blood in more or less large quantities may be passed. In the chronic cases chronic abdominal pain often amounting to colic, diarrhoea, unformed stools, or occasional constipation, local abdominal tenderness, flatulence, and distension result. General symptoms to which I shall refer later may be associated.

A good example of such a case is as follows:

Mrs. C. S., age 34, married, 2 children. Ill 4 years. Acute attacks of abdominal pain were the main symptom. The last two years had been spent entirely in bed, and in the course of that time, she had, at the hands of the various specialists called to see her, had four major operations. A gynecologist diagnosed ovaritis and removed one ovary. A surgeon, appendicitis and removed it. Another surgeon, renal colic and explored the kid-

ney, finding nothing, and still another, gall stones, with a similar result. The physicians now took charge and said renal infection and bacillus coli vaccine for that was given—result nil. When I saw the case, the husband told me that in four years he had spent £2,000 on nursing homes and doctors. On examination it was an obvious case of colitis, and the cause equally obvious, severe pyorrhea. With suitable vaccine she was up in three weeks and out in a month, and after treatment at the hands of a competent dentist she has remained in excellent health ever since. Finally we come to the rectum, where rectal fistula and perineal abscess may be caused. We will now pass on to the results of absorption.

Firstly, the bacteria may enter the general system.

Endocarditis, pericarditis, pleurisy and empyema may result, and following appendicitis, may come peritonitis.

We now come to the absorptions of the toxins and I have left this to the last, although if not more important, it is at least more common. My own particular work is the treatment of neurasthenia, and I have proved absolutely that this disease is always due to a chronic toxemia, intestinal in origin. The bacteria causing the toxemia can always be isolated from the stools, and in over 60 per cent. of the cases prove to be streptococcus pyogenes longus.

This is nearly always associated with pyorrhea and the same streptococcus is found in the gums and tooth sockets. By suitable treatment the disease can always be cured. Vaccines, sour milk, and high colonlavage for the intestinal condition, and treatment by a competent dentist for the teeth, to remove the source of the infection, invariably result in a cure of cases which have proved intractable to all other means. Most of the cases which come to me have been through one or more of the usual old routine methods of Weir Mitchell treatment, and various rest cures, massage, high frequency, sea voyages, and so on ad nauseam, and yet no one ever seems to have looked for the cause of the toxemia, namely, the pyorrhea. I will give you a few illustrative cases from my case book:

CLASS 2 (a) STREPTOCOCCI—CASE 1.

A. S., male, aged 36, married, schoolmaster. Neurasthenia 3 years, which latterly became so bad that he had to resign his

position as head master of a public school. The first symptom noticed was a burning feeling of the face, hand and back of the neck. Then followed lassitude, depression, and great irritability. He had no constipation, but was always worrying about the action of the bowels, the stools always being light-colored. The blood pressure was 200 mm. The reflexes slightly exaggerated, marked insomnia, frequent micturition, great physical weakness. —Marked pyorrhea present. *Streptococcus longus* was present in pure culture. Treatment commenced March, 1911. After the second injection he walked 20 miles and was much more cheerful. At the beginning of May the *B. Coli* equalled the *Streptococci* in numbers. Head much better. Blood pressure 170. In July much better generally, blood pressure 150, streptococci diminishing, insomnia only causing one bad night in five. In November no insomnia for three months, no depression, blood pressure 160. Faeces have resumed normal type, culturally and microscopically. In March, 1912, writes that he is perfectly fit, and has taken up cross-country running.

The steady fall in blood pressure in this and other cases is very interesting.

Case 11.

Mrs. T., aged 37, married, 3 children, youngest 7. Colitis in India 7 years ago. Six years history of neurasthenia. Complained of great lassitude, depression, insomnia, loss of power of concentration, pains in legs, and chronic abdominal dragging pain, previously supposed ovarian in origin, but probably coming from the colon. No constipation, complexion muddy, skin dry, dark circles under the eyes, very anemic, marked pyorrhea present. Faeces showed almost pure cultivation of *streptococcus longus*. Treatment commenced April, 1911. The symptoms rapidly cleared up, especially the abdominal pain. Sleep and spirits became good, and the complexion normal. In September the faeces were microscopically and culturally normal. In a recent letter she reports that she is in excellent health.

Another large class of cases is that of chronic rheumatism. This is usually attributed to a gouty constitution, and in a lower grade of society to the exposure to the weather. Both these reasons, I am convinced, are quite wrong. Intestinal absorption usually of streptococci coming from pyorrhea is the usual cause.

For example—Mrs. I. C., 36, chronic rheumatism with swollen joints of the fingers and gout in one big toe. Creaking of the knees, insomnia, marked depression, loss of memory, and concentration. Muddy complexion, anemic and spotty, brittle dry hair. Four years history. Old pyorrhea. Complete cure in four months with vaccines and appropriate dental treatment.

In two papers I have read recently, one at the annual meeting of the British Medical Association, and one before the Royal Society of Medicine, I pointed out the connection and often the occurrence in the same patient simultaneously of pyorrhea with either neurasthenia, chronic rheumatism, colitis and neuritis, pointing to a common cause, and this deduction was borne out by the results obtained by appropriate treatment. From neurasthenia we pass to neuritis. Here again I am convinced that most cases of this complaint are due to the intestinal absorption of bacteriological poisons largely coming from pyorrhea. Sciatica and often facial neuralgia come under this heading.

Lyon Smith (P. R. S. M., 1913) pointed out that the common link in their astrology is a lowered resistance to some common pathogenic organism, which allows an invasion to take place, and the associated chronic lesions which have been found serving as foci of infection have been pyorrhea—chronic pharyngitis, post nasal catarrh, endometritis, gastro-intestinal catarrh, vaginitis, etc.—but he says he has not met one single instance of gout or rheumatism where there was not some degree of gum infection out of 359 cases. As an instance I will take the case of J. I., 42, engineer, neuritis of five years' duration, affecting the external peroneal nerve, resulting in drop foot on the affected side. Treatment had been as usual by diet, the poor patient having been a vegetarian, and teetotaler for over a year, and the administration of salicylates internally and massage and electricity locally, and the disease was steadily becoming worse. I found he was suffering from severe pyorrhea, and in three months after the administration of appropriate vaccines and treatment of his pyorrhea he got absolutely well, and today plays two rounds of golf regularly.

Eighteen months ago I became interested in the subject of exophthalmic goitre. The thyroid gland is a member of what is known as the third line of defence against poisons absorbed from the intestines. The first thing which struck me was how all patients

with this disease presented also many of the symptoms of neurasthenia, and I wondered if the same cause was at work. Examining the stools, I found streptococci in large numbers in each of the three cases and pyorrhea present. Vaccine was given, the teeth attended to and they all got perfectly well, the eyes went back, the tremor vanished, the pulse resumed its normal rate, and the thyroid its normal size. What happens here is that the thyroid gland hypertrophies and greatly increases the amount of secretion in order to cope with the poison circulating in the blood, and that excess of secretion produces most of the symptoms of the exophthalmic goitre.

Early in the year Major Mac-Harrison in a series of papers in the *Lancet* showed how certain streams in India were infected with bacteria which caused enlarged thyroids in the trout living in them, and in the natives who drank the water. He brought natives from another district and gave them the water to drink and they got enlarged thyroids. So also did the normal trout put into the water. He was able to isolate certain varieties of bacteria from the faeces, streptococci being one, and when a vaccine was made and given the thyroid got back to its normal size.

Pernicious anemia is another deadly disease which has of recent years been found to be almost invariably associated with pyorrhea. By local treatment of the latter and the administration of salvarsan intravenously, Byron Bramwell and others have succeeded in keeping many cases alive but whether the cure is permanent it is yet too early to say. Chronic headache, chronic muscular rheumatism, and chronic enlargement of the cervical glands are some of the remaining complications, and can only be briefly referred to.

Attention has been recently called to chronic iritis and choroiditis, due to pyorrhea, previously attributed to a rheumatic diathesis, and Steadman has recently shown a coincidence between pyorrhea and glossitis and general carcinoma.

To point out the general danger in which any individual suffering from pyorrhea lives, I cannot do better than quote from an address by Sir James Barr, reported in the *British Medical Journal*. "A foul-mouthed individual is liable to many troubles, and he is a greater danger to himself than others. The nose, mouth and bad teeth afford a large culture field for the growth of many pathogenic organisms, which are ever ready to attack the individual when his resisting powers are lowered. In the mouth

and throat the organisms are bred which give rise to such fatal diseases as pneumonia, pernicious and other septic anemias, etc. If the insurance companies added to the premiums one-eighth per cent for every bad tooth in the applicant's head they would do some good to the dentists and lessen their own risks."

Hector Mackenzie again said in the *Lancet*, "I need not enlarge on the importance to the health of the body of sound teeth and gums. In many of the medical report forms the examiner is specially asked to report on the condition of the teeth and gums. Unhealthy or defective teeth are responsible for much chronic dyspepsia and consequent ill-health, but there is one disease of great prevalence and of vast importance affecting the gums primarily and the teeth secondarily, which at the present time is ill understood by many members of our profession—Riggs disease. You find the margin of the gum red and swollen and pus exuding from the sockets of the teeth. A slight degree of pyorrhea may be passed over, but a high degree is incompatible with a good condition of the general health, and must always be considered as a source of danger. In my opinion no life with a decided pyorrhea is a good risk, and acceptance should be postponed until the mouth has been put in a healthy condition. When I come across a pale, unhealthy-looking subject I always suspect among other things this disease. When a proponent who wears artificial teeth is under an examination he should be asked to remove them. I have frequently found underneath the plates there are stumps with pus oozing from the sockets. Many a case of obscure health is due to a septic condition of the mouth, a condition which because unsuspected is not looked for and not discovered."

Anyone with pyorrhea is in a state of toxemia, that is to say, is continually absorbing toxin from his intestine. Such an absorption is bound to diminish his general resistance and so make him more liable to any disease whatsoever, be it scarlet fever or diphtheria, etc. Such an individual stands in a very dangerous position on the brink of a precipice, and one day trouble is bound to come from one or the other of the many diseases I have enumerated. The dentist who observes symptoms of general systemic infection when treating a case of pyorrhea should draw his patient's attention to them, pointing out the cause, and the need and beneficial result of medical treatment in addition to his own. A pasty, spotty com-

plexion, yellowish sclerotics of the eyes, bluish lips, anemia, the drawn, haggard look, often with dark circles under the eyes, prematurely grey hair, often brittle, are certain signs of a poisoned system, which point to the need for appropriate medical treatment in addition to a purely dental one, to ensure a return to a satisfactory state of health for the patient. Finally I should like to make it quite clear that I do not state that all the diseases I have touched on are solely due to pyorrhea; they may come from various causes, but pyorrhea is much the most common and therefore much the most important.

I thank you, Mr. President and gentlemen, for the kind way in which you have listened so patiently to my paper.

PRESIDENT'S ADDRESS*.

BY J. M. BARCUS, D. D. S., CARLINVILLE, ILL.

A former worthy president of this great society began his address with the words: "A year ago the greatest unexpected event of my life occurred, when by your votes you declared me your presiding officer for the present year. Furthermore, I am not unmindful of the fact that to be the recipient of the highest possible honor which lies within the gift of a state organization at first impresses the mind of an individual possessed of a modest temperament with some fear and apprehension as to the success or failure of the undertaking."

This is as accurately descriptive of conditions this morning as when read fourteen years ago at Rockford.

Every year the profession is reviewed in retrospect and in prospect by writers with more or less detail and for the most part with profit. It is not the intention of the writer to dignify this address by calling it historical, for the reason that in the program of papers, clinics and exhibits at the meeting of this society last year in celebration of its semi-centennial anniversary history of dentistry was brought forward to the minute.

So rapidly do things move with us, however, that the last year has seen advancements that are epochal in the history of dentistry.

*Read before the Illinois State Dental Society May 11, 1915.

The dedication, for instance, of the Forsythe Dental Infirmary for Children at Boston last summer has a significance which cannot be estimated. Instead of taking time to tell of this event of great importance to the profession and to mankind at second hand, I have asked the distinguished member of this society, and President of the National Dental Association, to present it during this session, as his was a prominent part in the dedication program.

During a session of the Medical Congress at the World's Columbian Exposition at Chicago, in 1893, reviewing the work of Pasteur and his co-laborers, Dr. DeCosta said, "Medicine has made greater progress in the last twenty years than in the previous twenty centuries." With the numerals changed to thirty, the same could have been said at that time of the profession of dentistry. The change is made to include the date of the invention or discovery of the use of the rubber dam fifty-one years ago by Dr. S. C. Barnum of New York, a discovery of major importance to dentist and patient, yet Dr. Barnum died a poor man. A verification of the proverb, "Ingratitude is the reward of the world."

Modern dentistry may be said to date from the discovery of the dam and to have made as much, or more progress since that time than any of the healing arts or sciences.

The Illinois State Dental Society has the proud distinction of going New York one hundred per cent. better and giving to the world two men whose discoveries rank with that of Barnum. Wherever and as long as dentistry is practiced the names of Taggart and Buckley will be honored.

With all our felicitations of ourselves, there are lapses which do or should cause regrets, as for instance, the neglect of the Post Graduate Course of Study gotten up by a most efficient committee of this society a few years since. It seems to the writer the only cause for its failure was the inexcusable apathy, perhaps we better not say stupidity, of the membership of the society.

I believe "Nothing great is lightly won,
Nothing won is lost."

It seems to the writer that a valuable aid to this end would be a Literature Exhibit, to be made by the committee on Science and Literature. Office and laboratory supplies are exhibited to the business and professional advantage of seller and buyer. Why

should not an attractive display of the best books, new and old, be a part of the program at our annual meeting?

It has been a personal experience several times that the keenest interest has been aroused in a book or books reviewed by the committee and if an opportunity to examine and order had been presented at the meeting probably the order would have been given, which, be it said with regret, was neglected with resultant loss to all concerned.

The intention was to buy the book, but it never got beyond the stage of a good intention with which intangible things Henry Ward Beecher said a certain abode was paved.

The work done by the last named committee was surely not light and the finished product was well nigh perfect, and I am optimist enough to believe it will still be made of use. Indeed, it, or something like it, must be put in operation, if the Forsythe, Rockefeller, Carnegie Foundations and Research Institute, of New York City, shed their benign influence over the lives of the laity to an extent commensurate with the investment in them of money and talent.

A physician, I think it was, said some years ago that dentistry was the badge of a partial culture. And although no dentist will let the assertion go unchallenged, and none but can disprove the broad charge by naming in our own state men whose mental attainments disprove the slur, yet there is some truth in the statement, but if dentists read less than members of other professions there is some excuse for it. The leading physician in a given community whose net receipts for the average day is a given sum, has worked fewer hours and surely with less bodily fatigue than the dentist in the same town whose income is probably less and whose bodily fatigue from his eyes to his feet is much greater, *but* notwithstanding the grind of a busy dental practice, dentists must devote more time to professional reading or our patients may not receive at our hands what they have the right to expect, and professional standing will be dwarfed and professional progress will be retarded by listlessness that should be overcome.

When I was a boy I took the Chautauqua Reading Course and one of the first requirements at the start was that a given number of minutes each day should be given to the study, and it is astonishing what can be accomplished by this systematic plan of reading

even a little daily, and we are nearly hopeless in our pretensions to professionalism unless some system of reading be adopted. I cannot too strongly urge the revival of the Post Graduate Reading Course and the pursuing of it as a matter of duty by the profession of the state, that the "New Dentistry" may "have free course, run and be glorified," and by the way a careful reading of the transactions of the Illinois State Dental Society at the Fifty-first Annual Meeting last year would be a valuable contribution to your professional armamentarium.

From a periodical of recent date, the following is taken:

Most careers are made or marred in the hours after supper.

It may seem to some that the few hours between supper and bedtime afford small opportunity for education. But they were sufficient for Lincoln and for Franklin and for millions of men who by turning these hours to advantage through special studies advanced themselves above their fellows.

"Dost thou love life? Then do not squander time, for that is the stuff life is made of." Benjamin Franklin, who said this, not only understood the value of time, but he put a price on it that made others appreciate its worth.

Bradstreet's in a summary of business conditions ascribes most business failures to what may be called "the size of their scrap-heaps." Nothing is at once more inexcusable and disastrous than waste, and the most disastrous waste of all with the average man is waste of time. The unused hours form the "scrap-heap" that has wrecked many a man's career.

That heap of waste which so many young men dump at the end of every day and consider useless, would, if rightly used, give priceless results in increased efficiency, higher service and better pay. Ambition, resolve, effort, purpose, persistency, confidence, courage, mental equipment, and success may be manufactured out of this heap of waste time.

This is not new to you, but it is appropriate:

"An hour with a book would have brought to his mind

The secret that took him a whole year to find.

The facts that he learned at enormous expense

Were all on a library shelf to commence.

Alas! for our hero; too busy to read, .

He was also too busy, it proved, to succeed."
Millions are doing it. Any man can who will.

If the title of this paper were epochs and it might as well be that as anything else, the mention of the discovery, capture and annihilation of several regiments of the bug endameba would call for a song of triumph.

The new treatment will probably get the attention it deserves in the next three days and in passing I will simply say:

"Rigg's Disease" is a lesion evidence of which seems to indicate that its existence is as ancient as any of the ills that flesh or bone is heir to, and because of its doubtful curability or more properly its incurability up to this time, and its prevalence, it has been the spectre of dental practice from time immemorial and its destroyer or destroyers will be held in much the same honor as was expressed by Dr. Garretson to a class of students when he said he would give quite a sum of money, mentioning the amount, for the erection of a monument of gold to the man who discovered the cause of cancer.

"Time tryeth all things." The work along this line done by Barrett and Smith, Bass and Johns, if it proves in time to be what in laboratory investigation and clinical practice it promises, will be of priceless value to the race, and the past year will be credited with another great record. So may it be.

Co-existing with pyorrhea alveolaris has been another monster of dental practice, lately slain by a modern Hercules.

Probably the dentist who, without natural talent for research or invention, never experimented with anything else, has tried original and new and old methods for the painless excavating of cavities with little success, and with the use of much time. From the patient's standpoint, nothing in the whole realm of dentistry is so attractive, and in professional life as in the world of trade, it is the satisfied or dissatisfied patient or customer that is an asset or a liability; that makes or ruins a business, and this phase of the subject must be considered at times, but a more valuable thing is the relief to the operator in the handling of his over sensitive patients with hyper sensitive teeth.

The painless and thorough preparation of cavities has been a desire and a longing that has almost amounted to despair at times. Before the days of the cast gold inlay we have occasion-

ally reached the limit of the patient's endurance in the malleting of gold fillings, have stopped, burnished the gold, sent the patient home and at another sitting in a week or more, finished the filling successfully, patient and operator happy. But the pain of preparation, in spite of sharp instruments, warm air, medical pain obtundents, etc., had to be endured, no putting it off with the hope of better success another time. All this is now a thing of the past and if the methods of the revivalist, good in their place, were appropriate at this time, we would all stand and sing the long metre doxology.

The subject of the Dental Relief Fund first brought to the attention of this society by Dr. Corbett in his address at the 1912 meeting, is mentioned here with much feeling. The matter should and therefore will sometime take tangible form and bear fruit to the healing of good men broken in spirit, health and purse. With the hope of shortening its nascent state and with the object of being recorded as favoring the cause it is here mentioned again.

In a letter from Dr. L. G. Noel, of the Relief Committee of the National Dental Association, he says in part:

"It was with much pleasure that I noted your interest in the efforts of our relief committee as manifested by your good letter of the 20th."

"It was my original plan and hope to get all State Societies to raise their dues by \$1.00 per member, and contribute the additional \$1.00 per capita to the relief fund.—In Tennessee it is working well, and all our members are satisfied. It is the best plan, will raise more money with less expense and labor than any other. Men talk of it as a "compulsory" method. That is an absurd view to take of it, the majority should rule in every body, and when a measure is passed by a majority the minority usually submits gracefully. All State affairs, all legislative business is so managed. It is the rule in all Stock Companies. The failure to get concerted action in the State societies has forced your Relief Committee to try other measures, hence the Christmas seals and the begging circular letters. These latter methods have been thus far productive of small returns, and the labor incident thereto is, to use Dr. Gaylord's language, "swamping the Committee."

"Another consideration in favor of the original plan, is the even distribution of the burden, making it light as air on every one.

"Now, Dr. Barcus, I take it that I need not appeal to you men of the Illinois Society in behalf of the importance of this movement. Surely we may pause in our efforts to push the car of Science forward to take care of those who are falling by the wayside. We have many old men who are now like Dr. Holmes' "last leaf," withered on the stem, almost ready to go down before the next adverse blast. Shall we not make the journey to the grave easy for them?

"Labor organizations take care of their unfortunates. Will the N. D. A. do less?

"I appeal to the Illinois State Dental Society through you, its President, to adopt our original plan. If you will do so other States will follow, and we shall soon see our way to success . . ."

Quoting Dr. Corbett, "There is very much that may be said in favor of this relief plan. While we are all enjoying health and prosperity and the luxuries of life today, yet in all probability the time will come with some of us, and we know not how soon, when this situation will be reversed."

Members in attendance at this meeting are enjoying a fair share of health and prosperity so far as known, but it is a safe statement that since the above was written, three years ago, worthy men in attendance at that time are not present at this meeting because they cannot afford the expense. A fund so small which at the start could be used only for the purpose of bringing such a brother to the meeting would be worth while. In the course of his address in Chicago last winter at the Chicago Dental Society banquet, Dr. Boynton of New York City said, speaking of people in general, "The pathetic thing in relation to it is this that people who are as respectable as you and I, who have made as earnest an effort as you and I to husband their resources, and fulfill their obligations to the world, have found themselves not only reduced to the last degree in the point of household economy, but the little savings which they had for a rainy day have vanished, and they are too proud to state the situation just as you would be and I would be."

The getting of a benevolent fund fails to materialize because

of the fear of raising the annual dues. Now a word as to this matter of increasing the dues and the laudable purposes a full treasury would serve. It seems to me, gentlemen, it should be an easy rather than a difficult and dangerous move to increase annual dues fifty cents or a dollar as a direct contribution for the use of the profession from which many will derive all of material benefit which this life will afford.

An increase of fifty cents or a dollar annual dues would soon establish a fund of several thousand dollars, and who thinks a dollar of it would be squandered, and by whom would it be misused? The report of the secretary and treasurer each year shows the financial affairs have been conducted as ordered and agreed upon by the society and who is the society but each and every member of it?

Original research worthy the name should be and must be paid for if at all by an honorarium or a volunteer gift after the service is rendered and the results are known. This is one of the things that, like the Californian's hospitality, is not for sale, cannot be bought and paid for as can professional service, and other merchantable commodities. Why should there not be a fund when it can be raised so easily, from which could be paid worthy benevolences, and material acknowledgment made by a grateful society? Institutions of learning, churches, all worthy philanthropies, all institutions, having for their object the betterment of society, are hampered in their effectiveness by the lack of funds. The fear that a full treasury would be a menace to this society is not shared by the writer. Capital, private or corporate, in the hands of people with common sense and a desire for service, will do no harm and the best and greatest results will fail of accomplishment without such aid. And then it can be done so easily. *Two cents a week for a man in the vigor of his producing years!* It must be the littleness of the conception on the part of those of us who are interested that kills the plan. Perhaps ten cents a week increase would appeal to you. Try it brethren, and I believe you will see the fund so raised economically administered as the financial affairs of the society have always been, and with your help and interest always will be.

If the plans of the N. D. A. in co-operation with the State Societies are carried out as contemplated, there will probably

be required an increase in the annual dues. If this comes to pass, Be a booster! Have a heart! Say to a timid brother that you have confidence in yourself that you can afford the small increase, and confidence in the integrity and wisdom of the changing personnel of the officary to believe that the money will be wisely and economically handled.

And then if we get more money than we can use profitably or if any one is becoming debauched by the inflated treasury, we can declare a dividend.

I don't know how extensive a report will be made by Dr. Lotz, chairman of the Public Service Commission, a committee second to none in its possibilities for service, to the public and to the profession.

A paper of great length could be read with profit before this, or any society, for that matter, on the subject of Education, and entering into it largely would be the possibilities in that line of the Public Service Commission as a source of interesting and helpful information to the public. I hope officers and members of component societies will interview Dr. Lotz at this meeting and see that he delivers to you during the year what the society through his committee has prepared for you and what he is anxious you should have.

"From the fullness of the heart the mouth speaketh." I would like to write an address on the subject of this society, but my talent is not equal to the great occasion; a word must suffice. The immortal G. V. Black, the value of whose varied contributions to this society cannot be computed, has said many times, that the society has been more to him than he has been to the society, and this is the universal personal testimony of all who have been regular attendants, strongest from those whose experience is longest.

To the men who perhaps are here for the first time and to the young men who have not attended often, I would say, form the habit of attending the meetings of the state society, and be assured by one who knows that the time and money used in attending this, the fifty-first meeting of the society, and its subsequent meetings, is not properly time and money spent, but time and money most profitably invested.

Your contributions to the society program may not be con-

spicuous, but you will receive much and your presence will be appreciated. "The strength of the pack is the wolf; the strength of the wolf is the pack; the relative debt of the one to the other is here hard to determine." In professional life the debt of the individual is to the organization.

This society has its real existence in the mental, moral, and may I say, the spiritual natures of the men who compose it. The society is but the material evidence of this. Submarine and aerial navigation, the telephone, wireless telegraphy, railroads and automobiles are not civilization, they are but results. Civilization is the physical, mental, moral and spiritual development of men and women, boys and girls.

Some such feeling must have been in the mind of Dr. Gallie. He said at the banquet above mentioned, "The slogan of today in all the different callings of life is higher efficiency." . . . "Schools from the kindergarten to our great universities and professional schools, are shaping their courses so that the greatest number will be benefited, so that it will bring about higher efficiency." . . . "And when we consider the social and civic organizations which are legion in this country, working day after day, both men and women, to bring about and consider all that which goes to make up a better life, the consideration of child welfare and of human uplift, and race betterment, it must and does stimulate the profession to do their share in this great work" . . . "All of our meetings are for the purpose of considering what can be best done to take care of the human race."

If there are in this society any whose laudable ambitions have not been realized, at some point in life this is true with everybody, it is perhaps not inappropriate to say, "Be not weary in well doing, for in due time ye shall reap if ye faint not."

"I HOPE I SHALL ALWAYS POSSESS FIRMNESS AND VIRTUE ENOUGH TO MAINTAIN WHAT I CONSIDER THE MOST ENVIABLE OF ALL TITLES—THE CHARACTER OF AN 'HONEST MAN.'"

The above, in typewritten form, has a conspicuous place on the desk of Woodrow Wilson, President of the United States. It was uttered by the first president of the United States—George Washington.

It was the motto that guided Washington's public and pri-

vate life, enabled him to become "first in war, first in peace and first in the hearts of his countrymen." It made him the first citizen of the world.

The motto of Washington, adopted by President Wilson, is one that every man who desires to serve his fellowmen should adopt, and strive to emulate the father of his country in maintaining it inviolate.

The Washington motto should be the motto of America. Strong is he who has the strength to say:

"I hope I will always possess firmness and virtue enough to maintain what I consider the most enviable of all titles—the character of an 'honest man.'"

We have a great plant, we look with pleasure and satisfaction on its size, its strength, the firmness of its materials, but to what purpose does it exist? Is the society working up to its capacity professionally and ethically? Is the health and physical well being of the state conserved and preserved to a degree commensurate with its possibilities? Are its aims upward as well as onward? Is it the thought of the thoughtful in this society that the people of this state shall be better served than ever before? We are living in an age with possibilities, obligations and blessings never dreamed of, and in our place when tried we shall not be found wanting.

A TREATMENT FOR PYORRHEA—NECROTIC TISSUE.*

BY J. S. BRIDGES, D. D. S., CHICAGO, ILL.

Mr. President and Gentlemen:

From data at hand we may deduce that vaccine therapy is not a panacea for pyorrhea or attendant ailments; in fact, my observation leads me to believe that serum treatment began losing ground by the time it had gained a foothold in the profession.

Emetin is now holding us enthralled and, from statements issued by the discoverers of its particular value to dentists, Barrett and Bass, and other widely known men, we have every

*Read before the Odontological Society of Chicago, April 13, 1915.

reason to suppose that emetin, used hypodermically, is giving results not known before.

Personally, I first experimented with emetin locally, as directed by Barrett. Unfortunately, I saw no improvement in my cases, and so, thinking that perhaps hypodermically, it would be found no better, I abandoned emetin for the time and returned to my own method of treatment, upon which I had been experimenting about twelve months.

From the very nature of the disease confronting us, many treatments, repeated at intervals, are necessary. To avoid the undesirable reactions likely to occur from too frequent hypodermic injections, especially when their use is conducive to mental anxiety and physical depression, a local treatment, to accomplish the desired results, should appeal to both patient and operator.

Pyorrhea infection will usually return time and again in the patient we dismiss as "cured"—and to produce a real preventive cure the patient must change his habits, his mode of living, must overcome his hereditary constitutional weaknesses; in fact, he must be born again.

The man of prehistoric days allowed little time or opportunity for pus-making germs to congregate about his teeth. He kept his teeth too busy chewing his hard-earned meals—probably coarse and uncooked—earned by bodily exertion out of doors in all weathers. He had no chance to lay on an overabundance of fat, and if he suffered from any of the diseases known to us to-day, his bodily tone and resistance were so perfect that they evidently made little progress; for among the many skulls of prehistoric man to be found in the Field Museum, the teeth are snugly set in their sockets and show no signs of having this infection. Many of these skulls no doubt belong to persons of middle age, for their teeth show evidence of tremendous abrasion; in fact, so extensive as to reach the vitals of the tooth—the pulp chamber. Thus we see that this is a disease of civilization. Since the day of prehistoric man something has happened to the tissue cells, because of our mode of life, especially our dissipations that beget disease. The degeneration of the cells around the alveolar process; the breaking-down until pus germs (staphylococci or streptococci) develop,

and absorption of the processes or roots, or both, takes place, depends upon a departure from the normal physical condition, a state of lower resistance. The causes of this state are many. The most prominent are syphilis, obesity and malnutrition.

As long as present-day ways of living continue, and we refuse to return to the life of our prehistoric ancestors, pyorrhea will repeat itself at intervals short or prolonged, as the case may be—so I cherish the belief that a local treatment is the proper one in the large majority of cases.

The remedy I present to you this evening is simple and may be applied readily, and has the additional advantage of staying "put." Many cases report that the flavor is discernible forty-eight hours after application.

I have had very effectual results, especially with old chronic cases that have dragged in and out of my office for years; cases of process absorption, with no pus visible, and in which the presence of the streptococci was shown only by culture tests. Also in cases where minute sacs of infection would find their way in all directions to the surfaces of the gums under treatment; in chronic fistulae; in tender points and spots above the apex of roots that had no fistulae, and which showed under radiographic examination or otherwise nothing to cause this tenderness.

I also find that catarrhalitis, gingivitis and general local inflammation respond most readily to this treatment.

I do not offer this as a cure-all, because a disease springing from such a variety of sources must be fought with different remedies, either singly or in combination. A patient with a history of high living and sedentary habits, and one with syphilitic history, would not respond to treatment in the same manner.

My treatment is made up of two parts, a liquid and a paste. The liquid is the cleansing and astringent agent, to be used after thoroughly scaling the pockets or necks of the teeth by mechanical means.

R

LIQUID.

5% trichloroacetic acid crystals,
2% adrenalin chlorid,
25% normal salt solution.
68% H_2O_2 .

I apply the liquid with a blunt-pointed glass tuberculin syringe. Frequently there is considerable hemorrhage, and if this is persistent it is best to dismiss the patient until a later sitting before applying the paste.

PASTE.

For a base the paste has zinc chlorid, bismuth, and magnesium sulphate, and, for a vehicle, lanolin.

Magnesium sulphate is placed in the formula to assist in breaking up albumin. Albumin is a fortification thrown up that prevents our reaching the deep-seated pus sacs. Chemical antiseptics to reach these sacs must coax them out by counter-irritation or reach the infected foci by penetration without destruction to the tissue cells.

As an active solvent of albumin, it is logical to suppose magnesium sulphate assists us in breaking into these foci.

The paste consists of: Zinc oxid, bismuth subnitrate, magnesium sulphate, Tr. iodin, 35%, aconite, U. S. P., eugenol, phenol 95%, lanolin.

To operate the paste, I use an ordinary hypodermic syringe, with a specially constructed flexible silver needle, having a well-beveled point.

I fill the syringe about two-thirds full, by removing cap covering the glass cylinder. (In sterilizing for subsequent treatment, it is only necessary to sterilize the needle, if care has been used in not drawing surplus from the point back into the cylinder.)

To attain the best results the paste should be applied in an area as free from moisture as possible. With the gentle use of air, bibulous paper points and isolation, dry the pockets thoroughly. Apply the beveled opening of the syringe point firmly against the root surface, and force the point well into the pocket, but carefully avoid disturbing the tissue sufficiently to bring on hemorrhage.

Gently work the surplus paste about the necks of the teeth with the thumb and forefinger. Later, after the gums have somewhat hardened, it is advisable to thoroughly massage the paste deep into the tissue. This applies especially to cases of catarrhal or general inflamed condition of the gums.

A treatment every other day for three or four sittings is usually sufficient to place the patients on their subsequent prophylactic course, which must spell exercise.

PROCEEDINGS OF SOCIETIES.

AMERICAN DENTAL SOCIETY OF EUROPE.

FORTY-FIRST ANNUAL MEETING, HELD IN PARIS, JULY 30 TO
AUGUST 1, 1914.

ILLUSTRATIONS FOR DR. BÖDECKER'S ARTICLE ON "ENAMEL, CARIES
AND IMMUNITY."

(This article was published in the April number of the DENTAL REVIEW, at which time the illustrations had not arrived. We take pleasure in presenting them in this issue, and will ask our readers to please refer back to the text for their elucidation.—EDITOR.)



Fig. 1. Relations of thyroid and parathyroid. (Founded on Schmieden.)

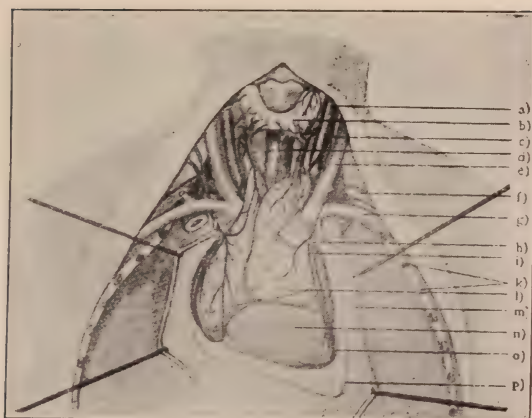


Fig. 2. Relations of the Thymus gland. (Kranz.)



Fig. 3. Skull of a Cretin showing, so-called "rachitic" teeth. (Kranz.)



Fig. 4. Mandible of 31-year-old
Cretin containing 19 teeth.
(Kranz.)

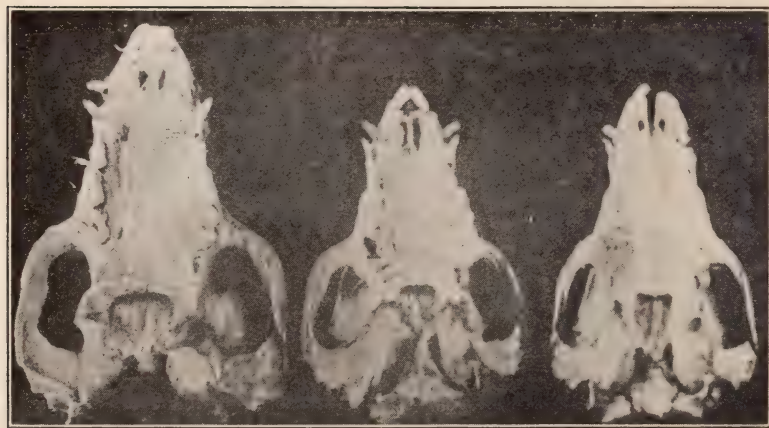


Fig. 5. (Kranz.)

Six-week-old control pig.

Twelve-week-old pig
with thyroid
removed

Four-week-old control
pig.



Case of cretinism described above.

Fig. 6. (J. Lewis Smith.)

The same case after six months' treatment with the thyroid extract.



Fig. 7. Skiagram of hand of 13-year-old girl, suffering from infant. Myxoedem. (H. Oppenheim and W. König.)



Fig. 8. The same, after about a year's treatment with thyroid extract.
(H. Oppenheim and W. König.)



Fig. 9. Rat with parathyroid removed which developed fractured incisors and faulty enamel. (Kranz.)



Fig. 10. Five and one-half-year-old bo. having no thymus, who spontaneously lost all teeth at 4 years of age. (Kranz.)



Fig. 11. (Kranz.)

Mandibles of dog from which the thymus had been removed showing retarded dentition and weak teeth.

Normal mandibles.

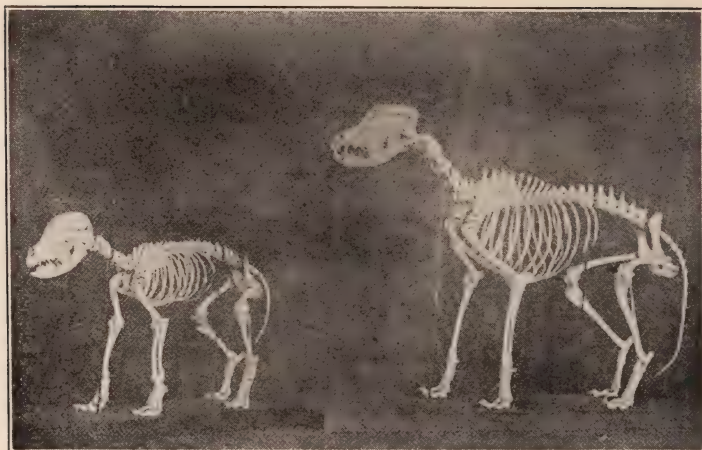


Fig. 12. (Kranz.)

Dog after the pituitary body had
been removed.

Normal animal of same
litter.

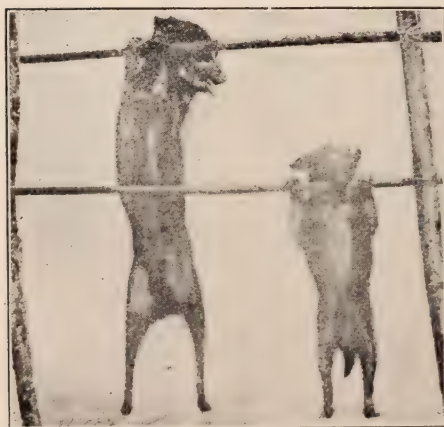


Fig. 13. (Ascoli.)

Normal animal of same
litter.

Pituitary body
removed.

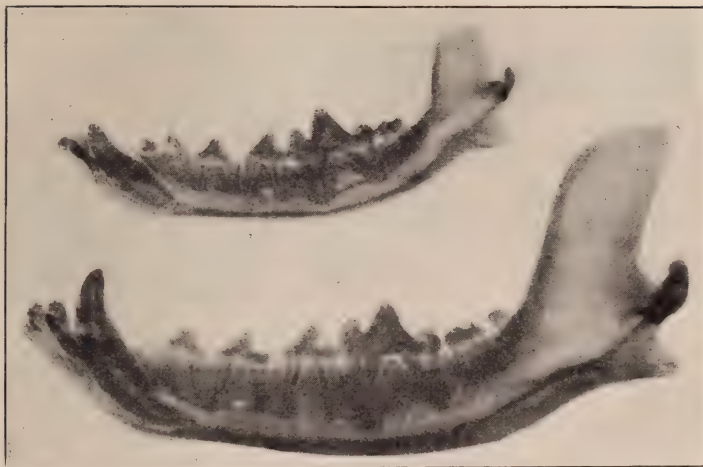


Fig. 14. (Kranz.)

Above: Mandible of dog with pituitary body removed.
Below: Normal animal of same litter.

DISCUSSION OF THE PAPER BY DR. BROOK ON "PYORRHEA IN ITS
MEDICAL ASPECT."

DR. HALLY-SMITH:

In opening the discussion, he said the paper showed clearly what the medical profession was going to ask of the dentist in the future. Dr. Brook had given much time and thought to scientific bacteriological work and had proved beyond doubt the great importance of bacteriology in the treatment of pyorrhea. A paper so deeply scientific must necessarily presuppose a great deal of knowledge of the fundamental principles involved, but it had to be borne in mind that while all dental surgeons were familiar with the principles, they were no specialists in physiological or biological work. The most astounding thing to him was the fact that while a number of men had been able to get good results in the work, they had all the most different conceptions of how the results were obtained. Pyorrhea had many names, but summed up, it came to this: There was irritation, inflammation and pus. The irritation came from foreign bodies round the roots and the free margin of the gum, and the inflammation followed the irritation. There was nothing complicated about it, yet pyorrhea was one of the most complicated

and dangerous conditions of the oral cavity, and it was for dental surgeons to bring about a permanent cure, and not allow medical men to step in and take the honors away from them. With the present development of vaccine therapy, dentists had an opportunity of putting themselves on an equal footing with the most scientific men of the medical profession. Dr. Brook went so far as to assert that dentists had an important part to play and therefore it behooved them to make an effort and co-operate with the medical profession. When roots were properly treated and foreign bodies removed and local treatment applied to the gums, it was generally sufficient to bring about a more or less permanent cure, but all dentists had had cases that remained after the work had been accomplished, and in those cases the use of vaccines would be of great value.

DR. VALADIER

Said he had been pleased to hear the ideas of Dr. Brook, as he had been working on the subject of pyorrhea for a little over nine years, particularly in regard to the treatment by vaccine therapy. He could honestly say it was the first time he had listened to a man speaking upon the subject whose ideas and work were running upon the same lines on which he had been working with his collaborator at the Pasteur Institute. Cultures with different media showed great variation of flora and they had never been able, either by direct examination or cultural methods, to isolate a microbe peculiar to the disease. Certain authorities who had studied the disease had described a certain number of microbes, either pure or in association, but as a rule they were always the same. Williams, McWatters, Eyre, and Payne, Carteret, Jones, Allen and, above all, Goadby, who had made the study of pyorrhea peculiarly his own, had found various strains of streptococcus, streptococcus aureus, pneumococcus, micrococcus catarrhalis. They had noticed that the streptococcus was the most abundant and the most often found. Classifications of streptococci had been made by various authorities. For his own purpose he had adopted the classification of M. H. Gordon into streptococcus pyogenes, salivarius, anginosus, etc. Goadby for some time thought that streptococcus salivarius was only a simple saprophyte in pyorrhea, but after a long series of observations he was led to change his opinion and he thought now that the microbe in many cases could act as a causative factor in the disease. Besides

the streptococcus he had generally found one other microbe in association. Seventy-two cases were examined and the streptococcus was present as follows: 22, *S. pyogenes*; 34, *S. salivarius*; 16, *S. anginosus*. In 9 cases the streptococcus was pure. In 8 cases the streptococcus was present plus pneumococcus. With regard to pernicious anemia, Dr. Brown had examined 53 cases of pernicious anemia, and in the 53 post mortems he discovered that pyorrhea existed in a terrible condition. His collaborator and himself had been working on the line of not only taking a culture from the pus which flowed from the cavities of the pyorrhea pockets, but also of obtaining a culture from the fecal matter, and they had found, as Dr. Brook had found, that in many cases the streptococcus was often present in the fecal matter, and in the same form and belonging to the same family as those discovered in the mouth. Wright used up to 25,000,000 of his injections of vaccine. By means of the sensitised vaccine he (Dr. Valadier) was running up as high as 5,000,000,000 in the injection and was able to obtain very quick results, non-toxic. He was sure Dr. Brook was working upon the line which must bring about the best results.

DR. BROOK

In reply, said the whole question lay in raising the specific resistance of the patient to the particular germ that was causing the trouble, and that was being done in various ways by various vaccines. Dr. Valadier had told him that he used the killed sensitised vaccine. He had not gone into the technical part of the vaccine very thoroughly in the paper, but usually he used the Wright vaccines, the ordinary killed bacteria, for the first three months, and then went on to use the sensitised vaccines if the result was not sufficiently rapid. The germs were sensitised with the patient's own blood serum. Having got the immune bodies to a certain extent in the blood serum from the killed Wright vaccine, the germs were sensitised with the anti-bodies from the patient's own serum and then injected. In London they had been using the actual live germs, but soaked in the immune body from the patient's own serum, and the results were better, he thought, than by giving the dead vaccines sensitised. Personally, he had used up to 200,000,000 of the Wright vaccines without any ill results, but it was necessary to be very careful. He had seen—luckily not in his own practice—very terrible results from giving big doses of the Wright vaccine

too early. The only trouble he had had was with a very small dose, 5,000,000. A patient had a sharp attack of colitis with 5,000,000, which was the usual minimum dose, and since then he had always started with 2,500,000 with colitis, and it was the only safe plan. He had seen very grave results from giving too large doses in osteoarthritis. He had seen some very sharp flares up in the way of osteoarthritis from deep scaling too many teeth at once; it opened up channels which allowed a good many germs to enter, which caused acute trouble. Very grave trouble could be obtained from too much deep scaling at one sitting, and doing the scalings too frequently, particularly where there was systemic trouble such as colitis and osteoarthritis. He suggested doing only two teeth at one sitting and giving four-days interval before doing any more. As a rule, the Wright vaccines were much simpler to make and quite safe. The sensitised vaccines could be given in larger doses. Broughton Alcock started with 200,000,000, but personally, he thought the smaller dose of the Wright vaccine answered all practical purposes and was simpler from the patient's point of view. With regard to Dr. Valadier's remarks on the varieties of streptococci, every worker in every laboratory had his own ideas as to classification. Dr. Brook thought that a classification of streptococci according to virulence much more important than one based on their sugar fermentation reactions.

On the proposition of Dr. Chiavaro, seconded by Dr. Monk, Dr. Francis Brook was accorded a hearty vote of thanks for his paper.

CHICAGO ODONTOLOGICAL SOCIETY.

A regular meeting was held at the Chicago Athletic Association, Tuesday evening, April 13, 1915, at 8 p. m.

Dr. E. A. Royce, president of the society, occupied the chair.

A paper on "Pyorrhea Alveolaris" was read by Dr. J. S. Bridges, Chicago.

DISCUSSION.

DR. E. R. CARPENTER:

Mr. President, I feel very much indebted to Dr. Bridges for bringing this subject to our attention in the crisp manner in which he has, and I want to thank him for his paper.

I regret that I have not had sufficient time to make as thorough an investigation as I would like to have made and as I intend to make later. The results, however, have been very pleasing so far. I have had about three cases in which I could use Dr. Bridges' remedies and I have had very gratifying results with the inflammatory condition where the pockets were deep, and there was considerable pus. They have cleared up very readily after the third treatment. One case I treated daily, one case every other day, and the third case every three days. As near as I can judge from the short time I have had, I should say that every other day gives the best results.

The thing that commends this especial line of treatment of Dr. Bridges' over the emetin treatment is the fact that the medication in the paste is held in solution so much longer that I think we are going to get better results, although I must say that emetin is very rapid in its action. I cannot add more as to the results, because I have not had time to use this remedy. Some of the old chronic cases I have not been able to get in, but I feel that we owe Dr. Bridges a real debt of gratitude.

DR. C. N. JOHNSON:

Mr. President, like Dr. Carpenter, I feel that we are indebted to Dr. Bridges for bringing this paper to us and introducing to our attention something in the way of treatment of pyorrhea. I have not had the extended experience I would like to have before making a report on the action of this treatment.

About two weeks ago Dr. Bridges sent over some paste in a syringe for me to test, and I have been trying it occasionally since then, and it does seem to bring relief to the patient better than anything I have tried in the way of local treatment. The problem with me is not so much to check the pus as it is to keep the teeth from going on progressively loosening after you stop the pus. It has never seemed a serious matter to stop the pus if I can get the co-operation of the patient. If we thoroughly curette the pus pocket, take out all the diseased tissue, we need not ordinarily go very much further than that to stop the pus, but in very many cases where everything has been done that I can do, the teeth go on progressively getting looser, and those cases are the most dangerous of any I have experienced. If I have something to fight, I can fight. but if there is nothing to combat, I am not a very good fighter.

Dr. Bridges spoke of one of his cases in which he said there was not much manifestation of pockets anywhere around the teeth, no deposit, and still the teeth became loose. Those cases have been the most discouraging connected with the disease. I believe if we will take this remedy of Dr. Bridges' we will get excellent results from it. I do not believe anybody is going to claim that we will cure pyorrhea by this or any other treatment so that it will always remain permanently cured. As the essayist has said, if you have the same condition after, you are likely to have a recurrence of the disease, but if we have some remedy to keep it in check, I think it is a very great step in advance.

I am glad to welcome Dr. Bridges here tonight, and express my gratification of having him with us.

DR. P. J. KESTER:

I am pleased to have been here to hear Dr. Bridges' paper, because it seems to me that the treatment is rational. From a cursory glance at the subject, one might think that the remedy that he offers is the principal thing in the treatment of pyorrhea, so that in a few words he makes it very clear that the removal of the various deposits is the foundation of the treatment. Heretofore this has constituted almost wholly the treatment for pyorrhea. The application of this paste, to my mind, has a reasonableness in it, inasmuch that in the application of it he has succeeded in making what I have termed in my own mind a persistent antiseptic. The great merit of iodoform that we used years ago was that it kept on smelling forever, and whatever antiseptic property it had it held. I am not comparing this remedy with iodoform. The great trouble with all applications to these pockets is that they are temporary. You wash out your pockets and apply your remedy, and in ten minutes the remedy has disappeared. It must be something heroic, almost like a surgical operation, to disinfect those pockets, and I can see how it is possible that this remedy will enable the dentist to control his case. In the lower orders of organic life you may destroy the parent micro-organisms, but they have usually left in their train a large amount of spores which immediately develop. Where you can destroy the germ itself and prevent the germs from setting up a new colony, it seems to me it would be a wonderful step in advance.

DR. TRUMAN W. BROPHY:

Mr. President, while Dr. Bridges was reading his paper, my thoughts were concentrated on the general principles which are laid down in pathology governing not only the diagnosis but the therapeutical agents employed in the relief of disease. If we look carefully over the work that has been done in medicine and dentistry regarding disease, and the remedies employed to relieve it, we find that almost every disease has passed through about the same experience. There have been times when men did not agree on the pathology and on the therapeutics, but today we find well-established principles, and well-established practice observed by the best men, as the correct principles and practice. No one would question the thing to do or the diagnosis of a case of well-defined appendicitis. The surgeon recognizes the disease and knows what to do, and does it. The surgeons agree as to the diagnosis and treatment, and the kind of operation that should be made. There is not any difference, nor is there in the post-operative treatment. When we come to the consideration of some of the conditions before us today, like, for instance, infections of the maxillary sinus, I go before a meeting of rhinologists with a paper and pictures of the actual conditions, showing the intimate parts, and when it is discussed I find the men do not agree with one another. There are as many different courses to pursue as there are men, and as many different views regarding the case as there are men. There is a lack of something that should be there. They cannot all be right, and they are probably not all wrong, but they should agree as to the very best course to pursue and that should be accepted instead of each man having his own way.

When we come to this condition in the mouth, there is no harmony in the profession as to the diagnosis, the etiology of the disease or the therapeutics. There are almost as many different theories as to cause and proper treatment as there are men considering it. This wrong must be corrected, and will be eventually, and I trust very soon there will be an accepted understanding and that all men will recognize certain principles underlying these maladies within the mouth, and then understand the proper remedies to employ to meet the varied conditions. When that time comes the public at large will be the beneficiaries. Here comes a medical man who does not know anything about dental manipulations, and

he proposes by the use of autogenous vaccines to cure these things, regardless of the local conditions, and through a want of education along the line of dental pathology, he believes he can do it, and I think he is sincere. Many a medical man has the notion that by certain kinds of autogenous vaccines he can cure this so-called infection. The condition is a dental alveolitis. There are twenty-two names given to this condition, and yet that is the trouble. There must be harmony. The truth must be told and understood and the principles which underlie that truth must be preached to everybody so that they will understand it. No one doubts what scarlet fever is. The physician knows what to do for it, and we all agree on that. Here is one of the diseases we do not agree on, and that is where the trouble lies, and, as Dr. Atkinson used to say, when we have arisen to that plain of ideality that will enable us to understand the same condition and look upon it from the same point of view we will have attained a very high plain in our profession.

I like what Dr. Bridges has told us very much. It seems plain, common sense without embellishment. I think if we can succeed in removing the deposit, and removing the granulations which are a product of the inflammation, then make use of this remedy that will destroy the pathogenic micro-organisms, Nature will come to our relief and do the rest. The teeth may not have deposits, nevertheless we have an inflammatory condition, with streptococci and pneumococci and various organs keeping up the condition and bringing about the destruction of the parts. There is not anything profoundly mysterious about this condition. Some few years ago one would think it was necessary to be especially endowed by the Creator to meet these conditions. Nobody who has not acquired that "delicacy of manipulation which is acquired only by experience"—words of our dear old friend Dr. Cushing—can succeed, and then with that delicacy of manipulation which enables the skilled operator to detect upon the root of the tooth a foreign substance that he cannot see, and carefully and skillfully remove it, he must more than all, and first of all if necessary, secure immobility of the tooth, to prevent it shaking around. You might as well try to get union of a fractured bone with no splints. It needs to be immobilized, and then followed by the use of Dr. Bridges' paste or some agent to relieve the condition; but of all things, we must have the

question settled so that nobody will be doubting as to what is the matter. I often think of the words of the late Professor J. Adams Allen when asked what the most modern treatment was of any disease. The answer was: "It depends on what is the matter." Now, it depends upon the complications here. Some cases yield promptly, while others do not. There may be something in the system, specific disease, tuberculosis, scurvy, or something that prevents the happy action of the local agent, and which needs general medication. All these things we must consider.

I want to express our commendation of what our young friend has done, and to say that his mission is a great one. By and by all these views will be harmonized. Just the same as religion. There is only one God. Some other man's religion may be better than ours, and his treatment of disease may be better than ours.

DR. J. G. REID:

Mr. President: This is not the first time I have expressed myself upon this question in this society, and I am as susceptible to being rejuvenated as anybody when the opportunity presents itself, and it hits me in the right spot.

I want to say this to the essayist, that we recognize tonight that he undoubtedly has presented an original prescription, foreign to anything that is within my own knowledge so far as this remedy is concerned. I want to personally thank him for this information that he has presented, as something new and novel in the way of treating pyorrhea.

So much for the essayist. Dr. Brophy has said that there is such a diversity of opinion about this disease and about the way it should be treated, that it naturally follows that the profession is disturbed and in a quandary. We get no results whatever while everybody is looking for something, and getting muddled. The man with good common sense is able to sift things to a better advantage than the general practitioner. I have read a good deal about this disease, and the public is interested in it. They are growing more so. There is hardly a day when people do not come in and talk about pyorrhea. They are interested in it, and as they become interested that creates a desire on our part to educate them as much as we can. Our opportunities are greater than they have been in years past. I think we are far from knowing the etiology of this trouble. I have practiced dentistry for forty years and I

have had my ups and downs in professional life, and I bump up against some conditions that make me think I do not know anything about dentistry, after all my painful experience. Until I know what is the cause of this disease, I do not feel that I am in a condition to handle it or treat it. We are speculating as to its cause, and there is such a vast difference of opinion existing today that we cannot harmonize anything. Until we center on something, it seems to me we are like smoke—soon dispersed. As I said before, the etiology of this disease is unknown, in my opinion. I think we knew as much about it twenty-five years ago as we do today.

We have only two conditions, one constitutional and the other local. I cannot help believing from my own experience that this is a local condition, aggravated by constitutional conditions. When you have removed the cause of that disease, which is an irritant, in my opinion, and have removed the deposits, you have cured the disease.

DR. KESTER:

When you remove the substance upon which this particular microbe, or whatever it is, exists, then the disease is cured also?

DR. REID:

Yes, without any question. If you take out the tooth you have cured the disease. Dr. Brophy made the statement that you must have the teeth firm in their sockets, and we know what a great difficulty that is. It is almost impossible to put the tooth at rest, but if we can do it, that is the thing to do. It is an impossibility to retain the tooth in the mouth without having a support to retain it. When the socket of the tooth is gone to a certain extent, what is the use of retaining that tooth in the mouth? It is a great mistake. If we recognize the introduction of the disease, we can permanently stop it, providing we can get the co-operation of our patient by prophylactic measures. There will be a time in this country when there will be no such thing as tuberculosis, because the people will become aroused to the fact that the white plague must be eradicated, and when we can get that same condition we will eradicate pyorrhea. We are in a condition where we hope to find something that will help. Dr. Bridges is one of the men who are doing something to help. As he politely has said, he is not offering this as a cure-all. I think we are making some progress in overcoming the difficulties. When Dr. Beck introduced bismuth

paste he did something entirely new that is today recognized as good for other things than the treatment of pyorrhea. No doubt, if he had lived to a good old age he would have been continually in the lead with his work, and so Dr. Bridges has introduced a similar substance, but it is new in many respects. Maybe he has a panacea, we do not know.

DR. TRUMAN W. BROPHY:

This thought brought out by Dr. Reid I don't think I ever heard mentioned before, that the micro-organisms which are ever present in the conditions about the teeth cannot stand exposure. Once exposed to the open, they die. A tooth removed from the socket, exposing the pathogenic micro-organisms which infest it, and which are so abundant in the soft tissue immediately surrounding that tissue, disappear. They fail to live after the tooth is removed and they are exposed to the secretions of the mouth. The socket heals kindly and the infection terminates.

DR. E. A. ROYCE:

Mr. President, it is somewhat embarrassing to follow two such eloquent speakers. We all appreciate Dr. Bridges' presence and realize the fact that he has brought to our consideration the application of his antiseptics to the tissues around the teeth, and in so doing has given us some very good information. No matter if Dr. Beck did introduce it with his paste, it has been practically dropped. According to the present theory, the particular germ, or whatever it is, that is to blame for the pyorrhea is subject to sudden death on the application of emetin. We will admit that is the case, but the administration of emetin locally is so very transient that it is a practical impossibility for us to follow it up closely enough to accomplish the object we are after by local the medicinal properties pass away in something like twenty-four hours. If we must have something further than what the doctor has presented to combat this ameba, I see no reason why the emetin cannot be administered in the form of tablets, and still we have our local antiseptics in a form to give us easy application and the lasting qualities necessary to reach the desired end. I think the doctor is on the right track and I wish to add my personal thanks. I think the Odontological Society appreciates these things and appreciates the men who bring them to us.

DR. BRIDGES (closing the discussion):

I want to thank you for your kindness in inviting me here tonight. Emetin taken through the stomach is rather apt to upset it. I think Dr. Beck used bismuth and vaseline more for the necrotic condition of the bone. Lanolin acts as a vehicle much better than vaseline, as it has the peculiarity of extracting moisture from the tissue, and clings if the surface is dry.

For a good many years we have been looking for the cause of pyorrhea. The only teeth I have seen missing from ancient skulls looked as though they had been knocked out through some mechanical blow. The surrounding processes were standing upright.

It seems to me that a tooth that is held in a splint is at a medicinal disadvantage by having a shelf over its pocket, for if a tooth has a normal amount of exercise it has additional ability to throw off infection. When a tooth is so very loose that a splint seems necessary it is usually, I think, because the process is so far gone, the tooth is almost past hope. I have used the paste in several cases where I expected to extract the tooth, and so far as I could see I destroyed the pus-making germs. After through experimenting I extracted the teeth. There was no process about them.

THE JENKINS' DINNER.

On the evening of May 15th, 1915, Dr. Newell Sill Jenkins was tendered a complimentary dinner by his friends in the profession at New Haven, Conn., on the occasion of his return to America after a residence abroad of fifty years. We hope to give a more detailed account in our next issue.

THE DENTAL REVIEW.

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EDITORIAL.

THE GROWING RESPONSIBILITY OF THE DENTAL PROFESSION.

The developments of the past few years have in several respects increased the responsibility of the profession. First came the awakening on the part of the people at large, through various methods of education, as to the importance of the teeth and mouth as factors in bodily health. This at once increased the demand for dental service, and threw upon the profession the obligation of meeting this demand in a satisfactory manner. With the eyes of the populace upon the dentist he was forthwith placed upon his mettle, and if he failed to make a favorable impression by the character of his services he lost patronage. He was weighed in the balance of public opinion with more scrutiny than ever before, and it became necessary for him to demonstrate a greater efficiency to stand the test. That so many did stand the test and very materially extended their usefulness is a matter for congratulation. It is safe to assert that never before in the history of dentistry has there been so much service of a commendable character rendered the public as is being done now.

To be sure, there is also much that is not commendable, and this fact robs us of any complacency which might otherwise tempt us to be satisfied with our achievements. With some of the evidence before us we cannot "lay the flattering unction to our soul" that we have attained perfection or that we have fully met the obli-

gations thrown on us by the situation. But we are daily making a better impression on the people and interesting them more and more in the care of their teeth.

Now comes another challenge which should stimulate us to renewed effort. It comes not from the people, but from the medical profession, who have suddenly awakened to the importance of the teeth, and are focusing their attention on conditions in the mouth as they never did before. They are tracing many of the ills to which flesh is heir directly to the roots of the teeth. They are demanding of their patients that they consult the dentist in their propaganda of running down the causes of certain diseases, and then they are demanding of the dentist that he make the mouths of the patients healthy. Both demands are reasonable. They are turning the light of the X-ray on the otherwise hidden work of the dentist—particularly on root canal work, and the result is not always flattering to the technical skill or honesty of the dentist. It is true that in some instances they are making erroneous interpretations of X-ray pictures, and reading a wrong diagnosis into them. They are judging the work of the dentist incorrectly, and doing injury in unduly alarming the patient; and yet there is sufficient justification in their contentions to compel the dentist to meet the issue squarely and assume his proper responsibility in the matter. The evidence of the X-ray cannot be ignored, even though at times a false interpretation is made.

Every time a dentist fills a pulp canal he should have in mind the possibility of a subsequent inspection of his work by the X-ray, and if he does this he will surely be more careful in his technique. It is a good thing at times to have one's efforts checked up and passed upon by others. It forms a splendid antidote to self-satisfaction, and self-satisfaction is the worst canker that can eat into a man's energies.

In another particular must the dentist assume a broader responsibility. He must become a better diagnostician, and be able to detect incipient bodily ills through the evidence presented in the mouth. Frequently patients would be saved serious difficulty if warned in time by manifestations which the dentist is able to read long before the disability becomes so great as to drive the patient to a medical man or surgeon for relief. The

dentist of the future must be a man of broad learning and acute observation in addition to being skilled in a technical way. In short, as the intricacies and ramifications of dental practice increase, the responsibilities of the dentist grow correspondingly greater.

THE EDITOR'S DESK.

ABROAD IN WAR TIMES.

ANOTHER VACATION STORY.

(Continued from the May issue.)

London (Continued).

As we were walking through the Tombs of the Kings in Westminster Abbey we saw, in addition to the clerical-looking gentleman who was describing them to us, a man who discreetly followed after us. He seldom said a word to any one; in fact never spoke unless spoken to, but was unobtrusively dogging our steps wherever we went. I imagined he kept his eye particularly on my "Three Girls," and finally the Mater said to me: "I wonder what that man wants, or what he is doing here." I was as much in the dark as she, but we soon learned. His presence was explained by seeing on the wall near the chair in which the Kings are crowned a cruel dent—freshly made. That omnivorous bird, the militant suffraget, had been in the Tombs of the Kings, and had supposed that if she destroyed this chair it would induce the British parliament to vote universal suffrage. So she took a fling at it with a brick or stone, but she only proved that after all she was just an ordinary woman by the fact that her missile missed the mark and merely banged the wall. Naturally, the custodians of Westminster Abbey are a bit suspicious of women walking about the Tombs of the Kings, which accounted for the fact that this man was surreptitiously watching my "Three Girls." Bless his heart, I could have assured him that not one of them would have harmed the legacy of a mouse, let alone injured dear old Westminster Abbey.

One of the places we visited was Guild Hall, where are given all the Lord Mayor's banquets. The place was old enough to have banqueted several generations of Mayors. Every church or hall or public building in London, as in Paris, was decorated with tablets or statues of noted men of the past. The one most often met in London was Wellington, and in Guild Hall I remarked to the caretaker that England needed another Wellington just now. "Yes, sir," he said, "that is too true." And then, as if to correct himself, he quickly added: "And maybe we have one, sir—who knows?"

I was much impressed with the calm confidence which every Englishman had in his country, and her defenders, and surely the British troops looked as if they could give a good account of themselves. Before I went to Europe I had heard much about the decadence of England, as represented chiefly by certain types of her population in her larger cities, and certainly there is cause for much concern over this important matter. To study the types on some of the streets of London is to see in the faces of men and women a sure sign of degeneracy and degradation. Drink is the common curse of the people, with all its trail of evils—poverty, crime and inefficiency. In no other city have I seen drunken women led to the police station by the officers, and it is a common sight in London. These people show in every act that they are undesirables, and an incubus on the commonwealth. They are the jellyfish type, without a bit of stamina, either mental, moral or physical. And most of them are hopeless so far as reform is concerned—they have not the basis of character left. They are idle—for the most part not because there is no work to do, but because they are incapable of doing it. As one gentleman put it to me: "It is not so much the problem of the unemployed as it is the problem of the unemployable." And it is this problem which England has on her hands.

Oh, England! England! In the language of one of your Princes who came back from your Colonies where he had seen a better and more virile type of man, the moment he landed on your shores he exclaimed, "Wake up!" It may be that this terrible war is after all a good thing for England. It may be that she needed a baptism of blood to rouse her from the lethargy which permits so many of the class of citizens to which I have

referred in her midst. Because they do not need to be there. British blood had too pure a source to permit any excuse for the degradation to which so many of her citizens have fallen today. And to prove this it is only necessary to point with the finger of a pardonable pride to the large class in England who represent the highest type of manhood and womanhood—people who are as steadfast in their principles of right and justice, and who are mentally and physically as well qualified to carry out these principles as any people on the face of the globe.

If this war can bring England to her senses, can make her realize that her only safeguard is to develop a better manhood and womanhood in her midst, and to eliminate her tap-rooms and the floaters who frequent them and who are a handicap on her body politic, then it will not have been fought in vain. No nation, no community, no individual can court the walks of sensuality, of drink, and lust, without suffering a disintegration of character which sooner or later will inevitably work their downfall; and this is the fundamental lesson of all life whether in individuals or in nations.

The last Sunday we were in London Mr. Ivey of Toronto was piloting me around some of the noted streets of the city and showing me many of the new buildings which had been erected. He said that in the last twenty-five years London had undergone a remarkable change in some of her districts; then he suddenly turned a corner and said: "But here is a little bit that has still been left standing," and he wheeled me in front of a tiny, crumpling old building, and I read, "*The Old Curiosity Shop, made famous by Charles Dickens.*" I think Mr. Ivey enjoyed my stare. As a matter of fact, Dickens had made me familiar with most of the streets I was walking on, and I am not sure that it would be a bad idea for a man who was about to visit London to re-read his Dickens first. About the only comment I recall making as I gazed at this miniature chunk of Ancient architecture was: "Poor—Little—Nell."

But London is not all being rebuilt, because I saw one structure with the date 1243 carved in it. I kept feeling older and older, and in my wildest imagination I could not in those days in London conceive of anything like a new skyscraper. And in this connection I am wondering if any of our modern twenty-story

buildings will be left standing in the year 2585. I doubt it! In all probability if the present craze for air space keeps on, long before that they will all be torn down to make room for eighty and one-hundred-story structures. But, maybe—just maybe—people will revert to sanity again and get back nearer to mother earth.

One day as Dr. Brophy and I were walking along Fleet Street he said: "I want to take you into a quaint place near here for luncheon." And then he peered carefully at every doorway lest he might miss it. Finally we came to a small opening in the wall, and in we dodged. We walked up a narrow passage way and I read: "*Ye Old Cheshire Cheese Inn.*" As every one knows, this is the famous old inn where Dr. Samuel Johnson of ponderous dictionary fame was in the habit of dining with his cronies and expounding his equally ponderous philosophy over a well-cooked rump-steak pudding. I sat on the seat where my distinguished predecessor had sat, and I could not help feeling that if he were alive today I would suggest to him to have a ponderous cushion made for that seat. I have almost forgotten whether or not I ever sat on a chair during my stay in London, but mostly I remember sitting on benches everywhere, and the hardest benches I ever encountered. But I forgive them—they had to be hard to last so many years.

Which reminds me that I was terribly disappointed in the comparative youth of the Cheshire Cheese Inn. I found it had been remodeled as late as the year 1667, and this made it—compared with many of the buildings I saw in London and Paris—a really modern structure. But it looks as if it had been there much longer. We happened in on the day of the famous rump-steak pudding, and of course we had some of it. It was a splendid pudding and well cooked, but I encountered one piece which made me wonder what kind of teeth Johnson and his compatriots must have had. We found the same waiters there who had attended Dr. Johnson—he only died back in 1784—at least I was led to suppose so from the familiar way in which they talked about him. They really spoke as if they had known him all their lives.

On leaving that day Dr. Brophy forgot a small parcel he had, and I told him I would get it the next day, when I intended

taking my family to lunch there. On returning the following day I discovered that the strangest thing had happened. I had imagined that they might possibly deny ever finding the parcel, but instead of that I discovered that it had been found by no fewer than four different waiters. It was the most extensively found parcel I ever saw, and I became so impressed with its value after I had tipped all four of them that I was almost afraid to carry it along the street. When I handed it to Dr. Brophy I said: "Brophy, what under the sun is in that parcel? I was really quite nervous, having it committed to my care." He tucked it flippantly under his arm and said: "A few linen collars." I had paid more in tips than the collars were worth, but then I argued that it was war time, and the waiters at the Cheshire Cheese must be kept going.

The time was now fast approaching when we were to leave dear old London town, and after all it was with a sense of sadness and with a resolve to go back again some day when there should be no more war. We had been treated so hospitably in London, it had been such a haven of refuge to us, that we shall always feel an affection for it. Some of its streets had grown very familiar to us, and the place seemed like a second home. I am certain I could walk the Strand in my sleep, and as for Trafalgar Square with the Nelson monument, it was like an old-time friend. And then there were Picadilly Circus, and Ludgate Circus—the most conspicuous feature of which as we came away was the Hamburg-American steamship office completely boarded up as if the company had all gone out of business and the proprietors died. Which we trust is not true. By the way, this word "Circus" needs amplification. Of course it does not in any sense mean the same thing as it does in America. It merely means a "Circle." So Picadilly Circus is a circle instead of a square.

Then there was Buckingham Palace where live the King and Queen. We walked down to see it one evening, but we did not go in. We have some consideration about disturbing folks at meal time, and anyhow we figured that the present social activities between England and Germany would fully occupy the attention of the good people at the Palace. King George and Queen Mary were in the habit of coming out on the balcony of

the Palace every night at the beginning of the war to make acknowledgment to the enormous crowds which congregated in front of the Palace. The enthusiasm of the people on these occasions was very great, but there was no disorder in the crowds and no confusion.

If we had listened to all the rumors which were floating about London just before we left we would not have dared to show our heads outside of a cyclone cellar. It was asserted that a German cruiser had been seen creeping close to the mouth of the Thames, and that a German airship was hovering about in that locality. I confess that the latter contingency impressed me more than the former, possibly because of the vivid recollection I had of having seen in France a fleet of flying machines being put through their tests for military purposes. On our way back from Versailles to Paris we were driven out to Buc, where are located the testing stations of the Farman aeroplanes. We saw eleven of these machines in the air at one time, executing all kinds of maneuvers, and the possibilities of such a fleet flying over a city or over a squadron at sea and dropping bombs made modern warfare seem so terrible that I have never quite recovered from the shudder it sent through me.

Subsequent events during the war have proved these aeroplanes to be a very important factor in the conflict.

C. N. J.

(To be continued.)

PRACTICAL HINTS.

Edited by J. E. Schaefer, D. D. S.

(This department is for busy readers. We want short articles containing practical hints—the shorter the better. No article must exceed 200 words, unless of exceptional merit. Every dentist has some useful hint that has been of value to him, and if he will only put it in print it may be of equal value to others. That is what this department is for. Due credit will be given for every article sent. Address J. E. Schaefer, 1745 W. Harrison St., Chicago, Ill.)

Babbitt Metal:—The reasons why Babbitt metal is preferable for dies is that it has all of the five requisites for a die. viz.: Non-shrinkage, hard enough not to batter, tough enough

not to break; makes a smooth die; melts at a low temperature. It may be added that a plate swaged on this metal fits the plaster model.—*L. P. Haskell, Chicago, Ill.*

To Cure a Fistulous Abscess:—Wash out with clean hot water in syringe, then use Campho-Phenique, diluted in alcohol and water (preferably warm), or if sinus is large enough, introduce Campho-phenique on small piece of gauze or some cotton. Two or three applications will work wonders. If there is swelling present I usually prescribe a bottle of citrate of magnesia—it works while you sleep and the next day most of the swelling has subsided.—*J. T. M. McCallum, D. D. S., Chicago, Ill.*

Ready-Made Crowns:—In using ready-made crowns I believe that it is a good plan to use a thin disc of base-plate gutta-percha between the crown and root, in order that the slight deficiencies of the junction between crown and root may be filled with gutta-percha rather than cement. The gutta-percha disc must be warmed and pressed to place several times, and the surplus all trimmed away before finally mounting.—*R. E. MacBoyle, D. D. S., Chicago, Ill.*

Proper Proportions of Amalgam:—At convenient times the operator, or assistant, can weigh into capsules ten and fifteen grains of alloy, and into other capsules the necessary proportions of mercury. These capsules are ready for immediate use, without inconvenience or loss of time, and the use of alloy in definite quantities will result in a great saving of material, because the operator soon learns the amount required for any particular cavity.—*W. E. Harper, D. D. S., Chicago, Ill.*

Tests with the "Phagodynamometer":—This clinic consisted of a mechanical device, with the carved surfaces of natural teeth in normal occlusion, which are brought together by means of a lever and a spring, connected in such a way as to register the number of pounds thus exerted in crushing foodstuffs placed between them; such as nuts, meats, dry bread, toasted bread, etc., etc. When a patient reports breaking a plate eating bread there is more truth to be given that statement than generally is

—for it requires greater force in masticating that article of food than it does many others.—*Geo. B. Macfarlane, Chicago, Ill.*

Abutments and Piers:—Teeth or roots to be used as abutments and piers must be healthy and strong. They should be in normal position in the arch, in order that they may not be subjected to undue stress or strain due to abnormal or faulty occlusion. There must be sufficient room for the employment of ample material to insure the strength, durability and efficiency of the piece under stress and strain. This same necessary space is also for the extremely important purpose of allowing the patient to properly cleanse the bridge. Mouths which receive care and attention are favorable for fixed bridges.—*L. W. Strong, D. D. S., Chicago, Ill.*

Synthetic Inlay:—The cavity is carefully prepared as for inlay. Impression and bite, if necessary, are then taken at the same time in modeling compound.

Cement model of cavity is made in modeling compound impression and allowed to set.

Then pour both sides, mount on articulator, and remove compound.

Adjust matrix and coat cavity in cement with cocoa butter; wipe out excess and insert enamel, *keeping under pressure* until set, about 3 minutes; cover with cocoa butter and let alone for 20 minutes.

Remove cement by cutting through it from reverse side and chipping it off. Drop filling into water until patient calls. Set as usual for inlays. Used in places difficult to get access to, or where it is impossible to keep dry.—*J. H. Hospers, D. D. S., Chicago.*

Concerning Inlays:—Artistic, comfortable and most useful occlusal surfaces may be made in gold inlays in the following manner:

Inlay wax is forced into cavity, patient bites while wax is warm; excess is removed; outlines for grooves and pits are scratched with sharp pointed instruments while wax is in cavity; wax is then removed and replaced two or three times to be certain of adaptation and margins; wax is then attached to sprue

former and carving completed (out of the mouth.)

It is not necessary to equip oneself with an array of special instruments in order to carve or reproduce in the wax pattern all the niceties of a perfect anatomical occlusal surface. The excavators (Black's spoons, No. 65 and 66), in every dental equipment are ample for carving any conceivable design, pit, sulcus or inclined plane, in the wax; and Flagg's amalgam instrument is only used to smooth off the carved surfaces.

Other instruments may be used, but these are quite sufficient for preparing the wax pattern.

After the casting is made the pits and fissures are polished in their deepest parts with pointed burs (bud burs) and the other parts are then finished with stones, discs and wheel brushes.—*D. N. Lewis, D. D. S., Lake Forest, Ill.*

Conductive Anesthesia:—The upper molars and bicuspid receive their nerve supply from the second division of the fifth nerve, the maxillary division, which is given off from the anterior side of the Gasserian ganglion, passes through the foramen rotundum to the speno-maxillary fossa, where the posterior superior dental and middle superior dental branches are given off. The posterior superior dental branch furnishes the nerve supply to the pulps and tooth sockets for the three upper molars and the mucous membrane of the maxillary sinus periosteum and mucosa. The middle superior dental branch furnishes nerve supply to the pulps and pericemental membrane of the bicuspid and anastomoses with the anterior superior dental division of the infraorbital nerve. It furnishes nerve supply to periosteum and mucosa and lateral wall of maxillary sinus.

The following technique is employed for blocking off all sensation in the preparation of sensitive cavities, extirpation of the pulps or the extraction of any or all of the upper molars and bicuspid.

First, mechanically cleanse and sterilize the field of injection by sponging the mucous membrane at the base of the molar process of the superior maxillary bone with a solution of equal parts iodine and aconite. The iodine sterilizes the field and the aconite locally anaesthetizes the mucous membrane.

Palpate the molar process and locate its posterior boundary

over the apices of the buccal roots of the upper second molar.

Insert the point of the long needle into the mucous membrane over the nail of the index finger and deposit a few drops. Gradually insert the needle, finally to its entire length, along the zygomatic surface of the superior maxillary bone and by withdrawing and inserting the needle, infiltrate the tissue beneath the attachment of the lower fibers of the external pterygoid muscle in the region of the orifices of the posterior and middle superior dental canals, using about two cubic centimeters of the novocain suprarenin solution.

After a period of ten minutes the nerve trunks will be anaesthetized, thereby blocking all sensation to the molars and bicuspid, also the antral branch which is given off in close proximity to these branches.

It may be necessary to block the anterior palatine division of the descending palatine branch from Meckle's ganglion for the extraction of abscessed molars or bicuspid, besides the posterior palatine branches as described above. The mucous membrane upon the lingual plate of the alveolar process should be sterilized with the iodine aconite solution and the needle inserted about one centimeter above the gingival margin of the gum on the lingual side of the upper third molar. A few drops should be injected here and the needle gently inserted to one-half its length and drawn backward and reinserted, infiltrating the tissues around the posterior palatine foramen with one and one-half c.c. of the novocain solution.

This technique will block all sensation upon the lingual side of the alveolar process to the cuspid tooth.

For operation upon necrotic process in the region of the molars and bicuspid both injections should be made.

For evacuation of the maxillary sinus in empyema the posterior superior dental injection should be made to block the antral branch and a submucous injection in the canine fossa for blocking the buccal branch of the upper maxillary nerve.

For extraction of impacted upper third molars the posterior superior dental and the posterior palatine injections should be made.—*C. D. Lucas, D. D. S., Indianapolis.*

MEMORANDA.

MINNESOTA STATE DENTAL ASSOCIATION.

The thirty-second annual convention of the Minnesota State Dental Association will be held in Minneapolis, June 11 and 12.—Max E. Ernst, Secretary.

IDAHO STATE BOARD OF DENTAL EXAMINERS.

The Idaho State Board of Dental Examiners will hold their next meeting in Boise, beginning Tuesday, July 6, 1915, at 9 A. M. at the State Capitol. For application blanks and any information address Albert A. Jessup, D. D. S., Secretary, Box 1414, Boise, Idaho.

NORTH DAKOTA BOARD OF DENTAL EXAMINERS.

The next regular meeting of the North Dakota State Board of Dental Examiners will be held in the armory at Fargo, N. Dak., beginning July 13, 1915. All applications must be in the hands of the Secretary by July 3d. For further particulars, write F. A. Bricker, Secretary, Fargo, N. Dak.

UTAH STATE DENTAL SOCIETY.

The Utah State Dental Society want to entertain all dentists who visit Salt Lake or Ogden, and we will be very glad to do so if we are notified when they individually or collectively will arrive in either of these towns. Earl G. Van Law, Chairman Entertainment Committee, 913-15 Walker-Bank Bldg., Salt Lake City, Utah.

AMERICAN SOCIETY OF ORTHODONTISTS.

There will be a meeting of the American Society of Orthodontists, held Monday, August, 30, 1915, at 9:30 A. M. at San Francisco, in the room assigned to the Orthodontia Section of the Panaca-Pacific Dental Congress. It is respectfully requested that as many members of the American Society of Orthodontists, as possible, be present. F. C. Kemple, president; F. M. Casto, secretary-treasurer.

BOARD OF DENTAL EXAMINERS, STATE OF WYOMING.

The Wyoming Board of Dental Examiners will meet at Cheyenne, Wyoming, in the Senate Chamber at the State Capitol, on the 29th and 30th of June and first day of July, 1915. The written examination consists of Anatomy, Physiology, Histology and Bacteriology, Chemistry and Metallurgy, Oral Surgery, Anesthetics, Operative and Prosthetic Dentistry, Materia Medica and Therapeutics, Prophylaxis and Orthodontia. Applicants must present a full plaster model of upper and lower jaws with teeth, also one without teeth. Practical work will be required from all candidates taking the examination. The candidate is required to furnish his own operating instruments, dental engine, amalgam, gold, wax and modeling compound. An examination is required of all applicants and only holders of diplomas from reputable dental colleges are eligible to such examination. The board does not interchange with other states, nor issue any temporary permits.

For further information and application blanks, address Peter Appel, Jr., Secretary, P. O. Box 643, Cheyenne, Wyoming.

THE FORSYTH DENTAL INFIRMARY FOR CHILDREN
140 The Fenway, Boston, Mass.
PERMANENT STAFF APPOINTMENTS.

An examination of graduates in dentistry (of less than three years' standing), for appointments to position on the permanent staff for full and one-half time service will be held on Monday, June 14th, at the Infirmary.

Appointments will be made for one or two years as follows:

Full time service requiring every day from 9 a. m. to 5 p. m., with one afternoon off a week, at a salary of \$1,000 per year. One-half time service requiring twenty-four hours per week, salary \$300; and will be made subject to satisfying the requirements of the Massachusetts State Board of Registration in Dentistry.

Members of this staff will be entitled to the advantages of reports and clinics by experts in the various branches of dentistry, from different parts of the world, in addition to the numerous regular clinics.

All material and necessary operating instruments will be furnished; up-to-date apparatus, including electric engines, sterile instrument trays, fountain cuspidors, compressed air and modern operating-room-type lavatories are available for use.

A diploma of service will be issued to each member of this staff who has completed this term to the satisfaction of the Trustees.

Applications for the above positions should be made not later than May 15th to the Director, Harold DeW. Gross, D.M.D., 140 The Fenway, Boston, Mass., who will gladly furnish information to those interested.

UNDERGRADUATE ASSISTANTS.

During the months of June, July, August and September an opportunity is offered by the Trustees of the Forsyth Dental Infirmary for Children to a limited number of undergraduate students to act as assistants in the clinics of the Infirmary. This privilege permits a student to obtain unusual clinical advantages in the various departments of the institution where operative dentistry, orthodontia, nose and throat, oral surgery, radiography, pathological diagnosis and research work are continually carried on.

Operators' gowns and all instruments are furnished. Over three hundred children are treated daily.

For further details apply before May 15th to the Director, Dr. Harold DeW. Gross, 140 The Fenway, Boston.

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No. 7

INTERPROXIMAL SPACE AND TOOTH FORM.*

BY CHARLES E. WOODBURY, D. D. S., COUNCIL BLUFFS, IOWA.

Gentlemen of the St. Louis Dental Society: It is very interesting for us individually or as a society to explore new fields or to travel in those by-ways which are little used or over which we ourselves infrequently pass. The well beaten trail which we use every day to go from our homes to our offices has little to interest us. Frequent use has satiated our appetite for its beauties. Its grades have been made easy, its paths smooth and very little effort is required or novelty experienced in its passage, consequently we lose interest in its traverse. The same thing is apt to occur in the ordinary practice of the office. Those things which we have done daily for years, those conditions which present themselves to us hourly, are less apt to receive intelligent individual thought than is the occasional operation which has not become a matter of routine.

It is really more important, however, to perfect ourselves in the science and technique of the daily operation than to devote our best efforts to those operations which we only occasionally perform. We earn \$100.00 making amalgam fillings when we earn \$1.00 treating disease of the antrum. We benefit our patients far more making good crowns and bridges than we do when successfully extracting impacted third molars. If we can improve our technique in these daily tasks in one small particular, is it not more important both to our patients and to ourselves than any other means of devoting the greater part of our professional energy?

This, gentlemen, is my excuse for reading to you a paper on a subject with which you are all familiar. If I can bring to your attention one new idea, or if the discussion brings a new thought to any of us, or if we are spurred on to renew the use of some of

* Read before the St. Louis Dental Society, March 15, 1915.

those things which we know and have done, but have recently neglected, the time will be well spent.

In treating of the interproximal space it is also necessary to consider the proximal surfaces of the teeth and the tissues lying adjacent thereto. These might be classed in four areas, the septal area, the embrasures, the proximal surfaces and the contacts. The interproximal space varies much at the gingiva according to the shape of the teeth, the age of the patient, the health of the periodontal membrane, the extent of the caries, the excellence of the dental operations and the amount and kind of use to which the teeth have been put.

The septal area should occupy the position of a pyramid with its base on the alveolar process, two of its sides on the proximal surfaces of the teeth, its apex at the contacts. The embrasures are to the buccal and lingual of the contacts and are the triangular spaces between the contacts and the axial angles of the teeth. The contacts are those portions of the proximal surfaces which actually come into contact with each other. The proximal surfaces are those surfaces which approximate each other. It would be difficult to say which of these areas is the most important, as the health of the teeth depends on all four and each of the four depends on the others. The keystone, however, is the contacts. If these contacts are insufficient, improperly formed or missing altogether, the soft tissues in the spaces become inflamed and absorb. If the teeth move together the embrasures become narrow and fail to be cleansed by the excursions of food. Plaques of bacteria lodge on the surfaces and caries results. If the contacts are rough or improperly formed decay of the approximating tooth will occur.

The width of the space at the gingiva should never be less than one and five-tenths mm. and is often as wide as three mm. Teeth of the thick-necked type have less space than the bell crowned ones. The age of the patient has much to do with this space. The teeth being set in an elastic socket, move considerably on one another during use, wearing the proximal surfaces, and it is a rare thing to find a person of 35 or 40 years of age or over with normal contacts. The loss of mesio-distal diameter from third molar on one side to the third molar on the other side averages at that age about one centimeter. This fact should always be taken into consideration when making operations on the proximal surfaces of the

teeth and enough separation made to compensate for this wear and to restore the interproximal space to its original size and the proximal surfaces to their original forms. Where an operation is made in a tooth on one side of the interproximal space *only* it is often necessary to exaggerate the restored surface and make what is called a plus contact so as to compensate for the wear that has occurred on both teeth and to hold the teeth apart with the one operation so far that the original width of the interproximal space is maintained. The amount of use and the substances chewed have a good deal to do with this interproximal wear, excessive wear being especially noticeable in chewers of plug tobacco.

The preservation of nearly normal interproximal space is of very great importance to the health of both hard and soft tissues. Its loss at first means thin attenuated gum septums followed by inflammation, absorption and pus. Proximal decays on the surfaces of the proximate teeth also occur, generally to the gingival of the contact wherever it may be; often penetrating the cementum and progressing rapidly toward the pulp without much external opening. To make the proximal surface of the tooth immune to caries under the gum septum, the gum must be healthy. To be healthy it must be in some bulk so that its summit is supported by a strong foundation of alveolar process and elastic tissue. A thick wide gum septum is tough, resistant and not easily injured. It is readily kept in a healthy condition, filling the interproximal space completely and preserving the proximal surfaces of the teeth from decay. With either a loss of interproximal space or a loss of contact this is impossible. A thin narrow gum septum is lacking in blood supply, has little strength or resistance, is easily injured and subject to inflammation and absorption. We often have a loss of contact, without a corresponding loss of interproximal space occasioned by the interlocking of the cusps and sulci of the teeth preventing them from moving together. This is even more serious than the loss of the space, as masses of fibrous food fill the spaces pressing on the gum septum, causing its absorption and allowing the inflammation to be communicated to the periodontal membrane. And once this periodontal membrane has been so injured as to cause a loss of any part of it, the gum septum will never reproduce; no matter with what care the contacts are restored or how perfect is the operation. We have noticed that as our patients

advance in years there is a tendency for the gum septum to absorb and that the interproximal space is no longer filled to the contacts. While I think that a small part of this absorption is physiological, the greater part of it is traumatic, caused by either a loss of contact or by a loss of interproximal space. My own observation shows that patients 50 or 60 years of age who have had these matters carefully looked after still have their interproximal spaces well filled by a gum septum in a healthy condition. Where the contacts have been lost and food particles pass into the interproximal space, old fillings should be removed and new fillings made restoring the contacts. If the teeth have never decayed cavities should be cut in the sound teeth and fillings made that will insure the health of the soft tissues, for what would it avail if you save the amount of tooth structure necessary to make a filling, and lose the whole tooth from pyorrhea?

The teeth naturally move in three dimensions of space, upward, outward and forward. It seems to me that the third molars have an especially important function to perform in moving all of the teeth forward and holding the contacts tight as interproximal wear takes place. Their position in the jaw is especially favorable for this purpose, the long axis of the lower ones being inclined forward and their distal and apical portions are set in a firm plate of hard bone. Its face is also inclined forward, the distal cusps being higher than the mesial, giving us the well known Bonwill curve. In the closure of the jaw the lower third molar strikes the upper third molar on an incline plane, the distal cusps of the occlusal surface of the upper molar being lower than the mesial so that as the lower third molar moves forward it drives the upper third molar forward ahead of it, thus keeping the contacts tight on both jaws and compensating for the interproximal wear.

It is better to prevent the loss of interproximal space and contact points than to try and regain it once it is gone. Here an ounce of prevention is truly worth a pound of cure. For regular patients this is brought about by early repairs on the proximal surfaces with a material which will retain its integrity. Fillings of oxyphosphate of zinc or any other material which slowly disintegrates should never be left in a cavity on a proximal surface for more than two or three months no matter what the age of

the patient; and the practice of filling cavities in such proximal surfaces of the permanent teeth of children as involve the contact points with oxyphosphate of zinc cement cannot be too strongly condemned.

Frequent examination of regular patients is very much to be recommended and there should be no occasion for any serious loss of interproximal space for such people. It is those unfortunate people who have no regular dentist, or who have no regular habits of going to any dentist who suffer most. Large cavities which have been allowed to go uncared for, or which have been filled without thought of restoring anatomical conditions, are a misfortune and are deserving of our best endeavors. The patient once they understand what the result of your services will be, generally give you their hearty co-operation. A few do not appreciate the necessity and are unwilling to give the required time. The results following their ignorance are sufficient punishment for their lack of appreciation.

The preservation of interproximal contact is equally as important as the preservation of the space. For those unfortunate people who have lost one or more teeth the contacts on those remaining should be pushed up tight and bridges inserted to supply the lost teeth, which also act as a splint to hold the whole arch in its proper position and to keep the contacts tight. When making bridges as much care should be used to get tight contacts and good spaces for each end of the bridge as would be used were the restoration a filling. Many operators who are careful to restore interproximal spaces and contacts for fillings utterly fail to realize that it is equally important for crowns and bridges. A crown is seldom used on a tooth until it is very far gone and its proximal surfaces often having been filled two or three times, generally with a loss of space each time so that when a crown becomes necessary there is contact at the gingival on both proximal surfaces, a very deplorable condition and one that requires much ingenuity to correct, but which should invariably be corrected. A banded crown is always a source of irritation and when we have no interproximal spaces or contacts in addition, the condition is one that invites inflammation and absorption of all the tissues surrounding the tooth.

The restoration of lost space is often very difficult and

sometimes makes such a disturbance of the other teeth that the entire restoration is impractical. This is particularly true where there is a crowded condition of the front teeth and the restoration of space in the bicuspid or molars increase this already undesirable condition. It is quite impossible to move the molars backward to any considerable degree and space restored is almost entirely by a forward movement. It is surprising how great this forward movement is if there is little resistance. On two different occasions I have closed a space of two and one-half or 3 mm. between the central incisors by making separations between the bicuspid and molars and building contacts. It requires the exercise of judgment in those cases where there is a loss of space in the bicuspid and molars and a crowded condition in the front teeth. The restoration of space in the back teeth increases the already bad position of the front teeth while a failure to restore space means a loss of efficiency in the back ones, so it is generally a question of choosing the lesser of two evils. Two of the most difficult places to restore lost space are where we have gingival contacts and the crown of the tooth is one-half or two-thirds gone, the repair necessitating a crown, and in those cases where the lower first molar has been extracted and the second molar tipped forward, bringing the distal root of the second molar practically parallel with the mesial root of the third molar. Any effort at separation resulting in a farther tipping over of the second molar and a restoration of interproximal space means the bodily moving forward of the roots of the second molar and a raising of the mesio-occlusal portion of the tooth by orthodontic methods, rather a difficult, but not impossible procedure. The restoration of lost space is ordinarily a simple matter, requiring time and patience more than anything else. Mechanical separators may be used to lift the teeth apart and gutta-percha packed in the cavity to retain the space. This is repeated at intervals of three or four days until the necessary space is gained. More rapid separation can be obtained by filling the cavity with gutta-percha or cement and tying cotton string dipped in paraffin tightly around the contact renewing every second day until the teeth are loosened. The separator is then applied, the necessary space made and the cavity packed with gutta-percha. It is seldom advisable to use rubber or other wedges placed in the

interproximal space as they are very apt to crowd down upon the gum septum, forcing it out of place and often injuring the peridental membrane so as to occasion its absorption. In the use of gutta-percha or temporary stopping the same care should be used to keep the interproximal space clear and the gum free from pressure.

In making space where a porcelain crown is to be adjusted probably no better way can be used than to cut off the tooth even with the gum and fit in pieces of dry wood, which should be replaced every two or three days. The root of the tooth will prevent the wood from injuring the gum tissue and will form a base upon which the wood will rest. Where the space is only desired on one side a temporary crown may be set and used as a means of obtaining pressure. For gold crowns it is nearly always advisable to make a temporary band and fill it with cement, bringing the band and the cement even with the occlusion. The interproximal space is then gained by any desirable method on one side of the tooth, a cavity is cut in the cement, the band stretched over into contact with the proximating tooth and the cavity filled with gutta-percha. The opposite side treated in the same manner and the patient dismissed for two or three months to allow the teeth to adjust themselves to their new positions when the permanent operation may be made.

There are numerous ways that suggest themselves to the ingenious operator for application to individual cases. No matter what method is used, however, the greatest care should be taken that no injury occurs to the soft tissues, otherwise the purpose of the separation will be defeated. As long as the peridental membrane remains intact the gum septum will reproduce, but once the peridental membrane is destroyed the gum will never again fill the interproximal space to the contacts. The health and safety of these tissues should always be kept in mind when making any dental operation.

After the teeth have been moved into their true anatomical relation to one another, it is necessary to make an operation that will restore the true anatomical form of the tooth. Whether it be a crown or a filling of whatever material, not only should the axial surfaces of the tooth be given their correct contour but the occlusal surface as well. As we carefully study the forms of the

different teeth in relation to the functions they have to perform we marvel at the efficiency of the machine. In its best type this appliance is perfect. It is too bad that man by wrong habits of living, lack of care, the transmission of disease and various other reasons has caused in so many cases a departure from the perfect type. In this ideal form every line, every cusp, every groove, every swell and every depression has its use and purpose. When making an operation upon a tooth a failure to reproduce any of these essential things to a greater or less extent reduces the usefulness of the teeth. The contours on the buccal and lingual surfaces have their individual uses and should be carefully studied and restored. The proximal surfaces of each tooth differ in form from all of the other teeth in the same mouth and when making operations these peculiarities ought to be noted and reproduced in the finished operation; even the shape of the embrasures is important and should have consideration.

When making dental operations the two surfaces that are the most often neglected are the proximal surfaces and the occlusal surfaces. For several years our attention has been called to the importance of the restoration of the proximal surfaces and while there is now a general acceptance of the necessity for its accomplishment it is too infrequently done. The occlusal surface, however, has always been a neglected area. True, when making gold crowns and bridges we have made some effort to reproduce natural conditions, but when making filling operations, a flat occlusal surface has been deemed all that was necessary. Do you not suppose that if a flat surface made the most effective chewing arrangement the teeth would have been made in that form originally? If Mother Nature knew what she was doing when she designed our teeth, why not copy her efforts and reproduce as serviceable an organ as possible? This can be done with gold foil, amalgam, inlays, crowns or bridges. If a plaster impression is taken of a finished operation to restore lost tooth structure and a cast made from it, it seems to me that it is perhaps not a failure but a very incomplete restoration if one can tell where the operation has been made.

We have all of us admired a set of healthy teeth, free from dental repairs, as a whole, but did you ever take one tooth in your hand and study its lines and curves in their harmony and useful-

ness? Any well formed tooth is a thing of beauty as well as utility and will repay any study that one feels inclined to bestow upon it. If you wish to produce true tooth forms it is absolutely necessary to study individual teeth in all their details. It is natural in making a study of a tooth that you choose as perfect a type as is at hand. You will find that the study of this tooth will have had its influence on your operation. The imperfectly formed tooth is much more apt to decay than the perfect one. When making your operations to restore these imperfect teeth the form of the tooth you have been studying will be constantly in your mind, causing you to improve the shape of the tooth operated on because you know what the shape of the tooth should be at its best. Your finished operation will have left the tooth and interproximal space in much better condition than they originally were.

Let me describe what to my mind constitutes an ideal condition between the upper first and second bicuspid: The interproximal space should be sufficiently wide to provide for a good healthy, firm and resistant gum septum that extends occlusally as far as the contacts. The proximal surface should conform in shape anatomically to that of the tooth. The effort not being necessarily to reproduce the shape of the tooth operated upon but that of an ideal tooth. The contacts are located slightly to the gingival of the occlusal surfaces and are well rounded and smooth like the surfaces of two marbles when brought together. When a ligature placed below them is held to the occlusal or buccal the sides of the ligature should not be more than one and a half or two mm. apart. The surfaces above the contacts are slightly curved as they approach the gingiva. You will also notice a longitudinal groove beginning at the occlusal plane of the gingival third and continuing to the bifurcation of the root. These curves and grooves are intended to make room for a thick gum septum and should be reproduced when possible.

The embrasures should open in nearly a straight line from the contact points to the axial angles so that when the food is separated by the contact points the cusps of the antagonizing tooth will force it freely down through the embrasure cleansing the proximal surfaces as it goes. In fact the embrasures should be sufficiently open to invite the passage of food through them. Particular attention should be paid to the marginal ridge and the grooves adjacent

thereto. The marginal ridge should be strong and high above the contacts, and crossed by a very perceptible groove to its lingual. These marginal ridges and contacts divide the food under pressure and the groove gives a free entrance to the embrasure, making an effective self-cleansing machine. If this result is obtained no time nor skill expended has been too great for the reward achieved.

In conclusion I wish to leave with you this thought: We are not medical practitioners only, we are not artists only, we are not mechanics only. If we are real dentists, we are a well balanced combination of all three. We are students, we are creators, we are designers, we are imitators. This seems to me gives us a sufficient opportunity for the exercise of our talents, no matter how great they may be. No profession has a better field, it only remains for us to dignify it by honest, earnest, thoughtful, conscientious effort

THE CORRECTION OF INFRA-OCCLUSION.*

BY DR. W. A. SPRING, DRESDEN.

It is a well known fact and commonly recognized today that Class II, Division I, cases of malposition (angle classification) were formerly almost invariably incorrectly diagnosed.

Frantic attempts were made to reduce the apparent protrusion of the upper incisors, and even extraction of beautiful bicuspid was resorted to when nine-tenths of the trouble was in the distal position of the mandible. In a similar manner the condition of infra-occlusion of bicuspid and molars is undoubtedly often overlooked because of the more conspicuous lengthened appearance of the incisors.

It would be manifestly absurd to assert that too long incisors do not exist, but it is undoubtedly true that infra-occlusion of bicuspid and molars lends an appearance of elongation to the incisors which can be beautifully corrected by lengthening the back teeth. The elongation was, in other words, only apparent.

A serious result of infra-occlusion of the back teeth is that the patient is compelled to bite distally. I have known many orthodontic cases dismissed as completed, where the patient simply could

* Read before the American Dental Society of Europe, at Paris, 1914.

not masticate food in any but a distal bite position, for when the incisors occluded correctly the molars were from one-quarter to one-half inch apart.

The broadening of narrow arches and securing of alignment of teeth is a matter of such common knowledge that every dentist is familiar with it, but I wish to urge and reiterate that the most beautifully aligned teeth, if short molars and bicuspid prevent correct occlusion, represent failure and the alignment will eventually be lost.

One unfortunate result of this condition is that the chin, which has been held back by narrow upper arch is now held back by the bunting of the lower incisors on the necks of the upper incisors.

It is to correct this difficulty in a simple, easy and effectual manner that the few thoughts of this paper are offered.

I was greatly astonished some years ago to hear a prominent specialist of orthodontia in America say that he had often tried to depress teeth in their sockets, but doubted if he had ever really accomplished it. I mention this remark because the first thought which would naturally occur to most of us would be to depress the lower incisors and that right early, by placing the arch so that it naturally rests low, even opposite the gums, and then binding to the incisors.

Consider for a moment the enormous leverage on the molars, and you will realize that the principal movement is there.

While it is the purpose of this paper to prove that the lengthening of the molars is correct and secures the desired result, this method is not advisable because painful, and moreover we have a much simpler way at our disposal.

I recommend securing alignment and normal broadening of the teeth, and as soon as the upper ones are correct in that particular I place in the upper arch a rubber plate with a raised flat biting surface to engage the lower incisors. This biting surface is not an inclined plane. The plate if made from a plaster impression holds perfectly and requires no metal clips on the upper centrals. To accommodate the plate nicely the molar bands should be plain, but I prefer plain ones anyway. By soldering a lug on the inside they can be removed easily with band removing pliers. The bite plane must be thick enough to compel a normal bite of the incisors, and broad enough so that the incisors cannot get back of it. When first placed in the mouth the molars and bicuspid do not occlude

by a good deal, and the patient must be carefully instructed to do all masticating on the bite plane. The plate must be worn constantly, otherwise no progress whatever will take place. The molars can then be easily lengthened by the intermaxillary rubbers, which may be applied by the triangular attachment, lower molar, upper molar and hook on the upper arch, or the simple attachment from lower molar to hook on the upper arch.

The upper arch in either case should have no support except the tubes on the molar bands. Very light rubbers should be used, otherwise a decided sagging of the arch and a corresponding tipping of the molars will take place. At this stage no attempt is made to bring forward the lower jaw. While the molars are being lengthened to occlusion the bicuspid's will often take care of themselves.

If they do not, I place bands on the first bicuspid's with spurs soldered at right angles to just engage the under surface of the arch, and begin using strong rubbers at once. As soon as the back teeth occlude, whether the arch is supported by the bicuspid's or not, strong rubbers may be used and the lower jaw will be brought to its correct forward position very rapidly, frequently in one week.

Test for progress is made at any stage in the work by removing the plate and noting the occlusion.

After relationship has been established the biteplane plate should be worn several months, otherwise the back teeth will be pounded into their old positions, and light rubbers may be worn if any tendency exists for the lower jaw to take the distal bite.

THREE RARE CASES OF REPLANTATION OF TEETH.*

BY DR. ANGELO CHIAVARO, ROME, ITALY.

Official Professor of Dentistry in the R. University of Rome.

In the Dental Ambulatory of the Dental School of the University of Rome, January 2, 1910, I removed for a young woman the four lower incisors, which even having had apparently sound crowns, their pulp was in a gangrenous condition, which was the cause of a running sinus of the chin, from which for one year pus was discharging. The necrosis of the pulp of the four lower

* Read before the American Dental Society of Europe, 1915.

incisors was the consequence of the habit that the patient had of cutting her thread with the anterior teeth while at her daily occupation of sewing, keeping during the day small pieces of thread in her mouth and trying to triturate them between the incisive margins, which were abraded down to the first layers of dentin.

Encouraged by the successes I have obtained during my professional practice in numerous cases in replantation and transplantation of teeth, I decided to try, in the presence of the students who attend my lectures, the replantation of the four extracted incisors.¹

Before proceeding to the extraction I made the necessary appliances for the replantation, consisting of a metallic cover for the crowns of the eight lower front teeth and in a vulcanized rubber cover for the crowns of the lower left molars. These two covers were to be cemented to the crowns of the teeth for which they were constructed; the metallic cover was made with the purpose of keeping steady in their place the replanted four incisors, as the cover was to rest upon the cuspids and the first bicuspid of each side, to which teeth only it was intended to be cemented; the rubber cover had the purpose of avoiding the occlusion of the teeth, except the left upper molars, which were to occlude with the masticating surface of the cover, for the purpose of mastication, avoiding any attrition of the replanted teeth with the opposite ones of the upper jaw.

January 2, 1910, as I said, I carefully extracted the four incisors and awaited the recovery of the sinus before I replanted them. In the meantime I prepared the four teeth by disinfecting them, smoothing root apices and filling the pulp-cavity with gutta percha.

January 9th, one week after the extraction, the chin sinus was healed and there was no sign of infection in the alveoli of the extracted teeth. So I decided to replant the four incisors, cementing in place the two described appliances.

I saw the patient every week for about a month and a half and on the 20th of February I took off the two appliances. I saw before this time that the teeth had grown fast, but I pre-

¹ Following the technique described in my work, "Il ripiantamento dei denti," *Giornale di Corrispondenza per i dentisti*, vol. 38, disp. 1, Milano, 1909.

ferred to take the precaution of waiting as long as I said before taking off the appliances.

In dental pathology it generally happens that when the alveolar tissue and its periosteum are destroyed by a process of purulent inflammation, the gum tissue, which is covering the region of the destroyed alveolar bone, atrophies in a short time, leaving free the corresponding area of the root; but about two years ago I had occasion to see that this dental pathological rule has some exception.

A lady in my private practice had a chronic abscess projecting upon the labial surface of the gum in the region of the upper right lateral incisor. The surrounding tissues were very much inflamed and swollen and the edema of the skin was diffused up to the periorbitary region of the corresponding side. Pressing over the gum tissue of the radicular region of that upper right lateral incisor and running between the gum margin in the labial surface of the root of that tooth was an abundant purulent material. At palpation and exploration could be detected the absence of the external wall of the alveolar process up to a third of the length of the root. The corresponding area of the labial surface of the root of the tooth had been partly destroyed by a dentist with a dental bur, reaching the root-canal; the superficial layer of dentin of the cavity was softened by decalcification, on account of the acting pathological process and of the use of acids applied as disinfectants. I found, in fact, the enormous cavity of the root filled with cotton wool which was smelling of acid material. The crown of the tooth was perfectly sound; the pulp of the pulp-chamber ought to be in place and gangrenous, while the pulp of the root-canal had perhaps been partially removed by the treatments, but the portion of the pulp of the apical third was surely to be found in its pulp-canal in a way of dissolution.

The lady told me that the tooth, although not decayed, caused an abscess and her dentist bored the root on its labial surface above the cervical line, which gave great relief to her sufferings. The dentist after a while tried to fill the artificial cavity made, but a recurrence of the abscess followed, together with pain, and he took out the filling, disinfected and dressed the cavity, continuing such treatment for about two years, in-

errupted only by another unsuccessful trial of permanent filling.

When the patient asked my services, after the examination, I saw the necessity of extraction of the tooth on account of the local and reflex pain caused by the pathological process and of the impossibility of a conservative treatment, but the patient was undecided about taking my advice, because she could not make up her mind to have a front artificial tooth and did not like to think of remaining without one.

In the meantime, while I remained firm in the opinion of the necessity of extraction, I could not think of the replantation of the tooth for the great destruction of the radicular tissues of the tooth and of a great part of the external wall of the alveolar tissue; but for the selection of the method of substitution I was undecided between the transplantation of a human incisor and the substitution of the lost tooth with a porcelain one, soldered lingually to an end of a piece of a strong gold wire, which, running on the palatal surface, could be soldered at the other end to a shell crown of the second right bicuspid.

I had the fortune of extracting the tooth without breaking it and I saw that its labial root surface was really destroyed for two-thirds of its length down to the root canal.

For the substitution of the removed tooth, the lady, for esthetic reasons, did not like to have marred, one of the two proximal teeth and disliked a shell gold crown upon one of her sound bicuspid and did not like an artificial tooth mounted in a little rubber plate kept in place by gold hooks, which I myself did not advise, because if eventually swallowed such removable teeth may become the cause of serious complications.

About the transplantation the lady expressed the opinion that she would not be pleased to have in the mouth an incisor which had belonged to another person, and she came to the conclusion that she could not remain without filling the space left by the extraction of the upper right lateral incisor.

By exclusion of all these methods of substitution there remained open the only way, replantation, which operation I feared would be unsuccessful because of the absence of a great portion of the alveolar tissue the gum would surely recede, beside the fact that the tooth could not grow firm. My doubt of suc-

cess was increased by the fact that I ought to substitute the portion of lost root with a large porcelain inlay, on the surface of which no one could think that the gum could become adherent; consequently would remain a permanent space between the internal surface of the gum and the external surface of the inlay. Through the space, for capillarity, the entrance of the septic liquid of the mouth would surely disturb any possible beginning of consolidation of the remaining area of the root.

The patient insisted upon the replantation and I, with a reserved prognosis upon the success of the operation, decided to take this occasion as an experimental replantation. After thorough cleaning of all the teeth I prepared the extracted incisor, disinfecting the pulp-cavity without boring through the lingual surface of the crown; I filled with a porcelain inlay the destroyed portion of the root, of which the greatest height was 10 millimetres and the greatest width 5 millimetres, having a lozenge contour. The inlay began two millimetres above the cervical line and reached the superior third of the length of the root.

After one month the consolidation had taken place.

Six months ago I saw the patient, one year and a half since the operation; the tooth is still strongly solid, although with a very thin probe I could penetrate between the gum and the surface of the porcelain inlay. The gum is of normal color and perfectly adapted upon the smooth surface of the inlay, which is entirely covered to the cervical line of the tooth, below which a small part of the inlay could be seen. Upon the surface of the inlay the lost alveolar tissue is not regenerated, but the nutrition of the gum tissue, which lies upon the surface of the inlay, is normal.

In my bibliographical researches, which I made for the preparation of a complete work upon the "*Plantation of teeth*," I could not find any publication upon the replantation of molars, followed or not by good success. In 1906 I tried replantation of an upper second molar, being present the two proximal molars. The patient, 46 years, was affected with pyorrhea alveolaris, of which I succeeded in curing her, but the peridental tissues of this only molar did not improve under my treatment, and the pus continued to run from the socket; the tooth was very loose.

I extracted it and waited until the tissues were in the process of regeneration, then I replanted the molar.

I removed the retention apparatus after a month and a half; the tooth was not solid and after a few days dropped out.

February 8th of this year I extracted at the Ambulatory of my Dental School in the R. University of Rome the lower left first molar from a student of the third year of medicine. The tooth was decayed and the gangrenous pulp was in a stage of decomposition, threatening to open upon the cutaneous surface of the corresponding submaxillary region; the extraction of the tooth therefore was necessary.

The extracted molar was larger than normal and had the roots enormously developed. I waited for the healing of the purulent process, which had caused a very noticeable thickening of the horizontal branch of the mandible, and the 22nd of February, having properly prepared the tooth and a rubber shell cover for the crowns of the posterior right lower teeth, which was to avoid the occlusion of the replanted lower left first molar, I tried to replant before my students the said tooth. Although as well as I could I had enlarged the socket with the Ottolengui special burs, with all my strength I could not succeed in replacing the molar in its place for the great resistance of the socket to the entrance of the distally curved enormous roots of the tooth. I tried to hammer the tooth in, knocking its masticating surface, on which I placed a piece of soft wood, but I did not succeed. All these manipulations were not painful, because the part was anesthetized with 2 per cent novocaine in physiological solution; at last I thought about the hundred pounds of power which it was possible to obtain by the contraction of the masticatory muscles of the subject and I asked the student to occlude strongly the teeth: the roots of the molar, then, without any difficulty, penetrated into their place!

I tied the molar to the near teeth with waxed dental floss silk and cemented upon the crowns of the lower posterior teeth of the other side the shell rubber appliance.

I ordered the patient to keep in the mouth for a couple of hours small pieces of ice, fearing that when the anesthetic action ceased the painful reaction would trouble him, but the student did not use ice at all and he said that the post-operative pain did

not come, although sometimes in the replantation of simple rooted teeth the painful reaction is very sensitive.

After 48 hours appeared a considerable tumefaction of the peridental tissues of the left side of the mandible, which during four days I treated by painting the part with water solution of iodine and with the most scrupulous dental hygiene.

The tooth up till the present is solid in its socket and the patient can use it. The future will tell us how long that tooth will be kept in place in spite of the great strength of the mastication, which does not occur in cases of plantation of anterior teeth.

From these three cases of replantation, which I think are rare if not unique in dental literature, the following conclusions can be drawn:

I. If the alveoli are existing the contemporaneous replantation of all the four incisors is successful.

II. There is possibility in the consolidation of a replanted simple rooted tooth, even if a large area of the surface of the root is substituted by a porcelain inlay and the corresponding alveolar tissue is absent; in such a case the gum covering the inlay remains normal.

III. In the technique of the replantation of molars if there is a great resistance in the restitution in place of the tooth, it can be won under local anesthesia only by the contraction power of masticatory muscles of the patient, asking him to occlude the teeth.

WHY REMOVABLE APPLIANCES FAIL.*

BY DR. F. EWING ROACH, CHICAGO, ILL.

A comprehensive discussion of the subject of Partial Artificial Dentures must of necessity include all forms of co-ordinate appliances employed as substitutes for the natural teeth that have been lost. And while the successful treatment of most of the cases that come to us depends upon the employment of both fixed and removable appliances it is my purpose to consider the removable appliance only.

* Read before the Chicago Dental Society, February 16, 1915.

In order that my use of the term partial artificial denture may be fully understood, and that a differentiation of these appliances be made, it seems that some explanation is necessary. We are all familiar with the terms fixed bridgework, removable bridgework and the synonymous terms partial plate and partial denture, but we are not in the habit of speaking of them all in the broader sense as "partial artificial dentures."

The word denture is defined in the Century dictionary as "The provision of teeth in the jaws." We find also under this same definition that *in dentistry a full set* of artificial teeth is called a full denture.

With the above definition in mind I believe there is ground for divorce from some of these old terms. You will note that the definition reads *in the jaws, not on the jaws*, therefore when we use the term denture we refer to a full set of natural teeth in the jaws, and to be specific and technically correct, we should use the term partial denture when referring to partial sets of natural teeth, and partial artificial denture when referring to any of the various forms of artificial substitutes for the natural teeth that have been lost, such as fixed and removable bridges and partial plates.

For convenience of description and brevity of terminology then I am going to divide the subject of partial artificial dentures into two classes, viz: First—Fixed appliances, and Second—Removable appliances. Under the first class may be included all forms of fixed bridges. The second class includes all forms of removable appliances and may be subdivided into removable bridges and partial plates.

And since there seems to be no clear line of demarcation between removable bridgework and partial plates in the minds of many, I will offer a definition for each which, as you will see, clearly differentiates between them. I would define then a removable bridge as that form of removable partial artificial denture which occupies practically the same space previously occupied by the natural teeth and their supporting tissues and a partial plate as that form of removable partial artificial denture which occupies space in the mouth other than that previously occupied by the natural teeth and their supporting tissues.

Most of the partial plates when properly designed occupy

such small areas of the mouth in addition to the space previously occupied by the natural tissues that we may very properly call them removable bridges with extension supports when speaking of them to our patients, but technically speaking partial plate is the correct term.

With this understanding of the terminology we will now consider the causes of failure of removable pieces. The question that naturally arises is, what constitutes success or failure in this work? Pieces that are worn in the pocket or in the bureau drawer are of course a failure, and yet we must not conclude that because an appliance is being worn in someone's mouth that it is a success. Quite to the contrary, in a great many instances. Owing to the damage being done to the remaining natural teeth and surrounding tissues by many improperly designed and poorly constructed partials the patient would be better off without than with them, and the stamp of failure might well be placed upon them. The destructive tendencies of all forms of partial artificial dentures is so great that the most skillful designing and building will not at all times avoid some damage and for that reason I feel keenly the need for an awakening on the part of the profession as regards our responsibility in this branch of our practice. We cannot much longer shirk our duty in this work and it is my sincere hope that we will not lay ourselves open much longer to such scathing criticism of our removable as has been made of our fixed appliances by the medical profession. While Hunter's criticism was directed more particularly to crowns and fixed bridgework because of the more apparent source of focal infection it is nevertheless true that we are deserving of severe criticism for the indifference we have shown to the damage we are doing in the indiscriminate placement of removable appliances in general and partial plates in particular. It is absolutely impossible for us to live up to the standards of requirement in the practice of oral hygiene, oral prophylaxis or whatever you please to call it, without giving to this subject of partial artificial denture construction our most serious consideration. Nor can we give to our patients the most efficient masticatory equipment without a knowledge of the more modern methods in this branch of our work.

The highest degree of success with removable appliances

depends primarily upon—First—A thorough knowledge of the multiplicity of available means and methods, Second—A thoughtful study of the case in hand, Third—The preliminary preparation of the patient, Fourth—Careful calculation in designing, Fifth—Close attention to details of construction and Sixth—Patient persistent care in the final adjustment to the mouth.

If you will but analyze the above statement you must agree that first of all we should be familiar with the various methods of known value regardless of whether we do the work ourselves or assign it to someone else. The operator who can make a secure inlay or a lingual hood abutment for a bridge in addition to the gold shell or Richmond crown has an advantage. The operator who can choose between several types of fixed bridge construction has an advantage. The operator who is familiar with several methods of removable bridgework has an advantage. The operator who knows how to combine the great variety of splints with the innumerable forms of fixed and removable appliances and can utilize to best advantage the host of different forms of clasps and attachments surely is prepared to render a better service to his patients than the one who is limited to only a few antiquated methods.

The next thing is the study of the case—the importance of this phase of the subject cannot be too strongly emphasized. In all our operations we are required to give more or less study, but there are none in which there is greater need for careful study than in partial artificial denture construction. The requirements for comfort, efficiency and conservation of the natural teeth of the patient is equal if not greater than in any other work we are called upon to do. Almost every case requiring a removable appliance is a law unto itself and must be studied with the view of selecting the best method.

The location, position, condition and formation of the remaining teeth, the condition of the alveolar ridge and the soft tissues generally. The amount of absorption that has taken place, the length of bite, the character and amount of force to which the appliance will be subjected and the habits of the patient must all be taken into consideration.

Having made a study of the case and determined upon the method to be employed, the next important step is to complete

a design. In other words, make a blue print in your mind of the completed case. And in doing this you will consider the different materials with reference to their relative strength, comparability, adaptability and compliance with the cosmetic requirements. The design will of course determine how much mutilation to the natural teeth will be necessary during construction and to what extent the appliance is likely to injure the teeth and gums while in use.

It is my belief that a large per cent of the cases that come to us for this class of service call for a combination of splints, fixed bridgework and partial plates. One of the common mistakes that is made is the dependence upon either one or the other of these methods alone, rather than a combination of two or more. Rarely is it possible to meet the requirements in supplying missing teeth in mouths where there is a predisposition to pyorrhea with either fixed or removable appliances alone. Our plans should be so made that the minimum mutilation of the natural teeth will be required and yet when the conditions are such that the mutilation of several teeth is necessary to accomplish the fixation and support of one or more teeth, and to put the mouth generally in better condition, we should not hesitate to do so. We must consider the mouth and teeth as a unit and not individually. So that the question of conservation of the remaining natural teeth when partial artificial dentures of all sorts are being supplied is indeed a serious one.

The preliminary preparation of the patient for this class of work involves a full explanation of our plans so that they may know just what kind of an appliance they are going to wear. The patient is also entitled to know of the several ways in which the work may be done, the advantages, disadvantages and the estimated cost of each. And in regard to the question of fee in connection with this work I feel that I must say something since it has come to my notice so often that inadequate compensation for these more complicated operations has been the cause for selecting some more simple method to the detriment of both patient and operator. In order that we may do this class of operations as they should be done our fee should be equal if not larger than for fixed bridgework.

With the design before us we are now ready for construc-

tion. All forms of removable appliances require more care in building than do the fixed pieces. The most accurate impression possible and casts made of a good hard plaster with the teeth reproduced in Modelite, cement or some substance much harder than plaster of Paris is necessary, and especially is this true where clasps fitted to natural teeth are to be employed. The common method of taking wax or compound impressions in mass, making casts of plaster of Paris only to which clasps are to be fitted and upon which the case is finished is too inaccurate to be considered a dental operation at all. Most cases where telescoping attachments comprise a part of the construction we believe that the abutment pieces with the attachment soldered to them should be in position when impression is taken. The most accurate fitting, strongest, most comfortable and in every way the most satisfactory construction for many of these removable pieces is the cast gold saddle with all porcelain detachable post crowns cemented to place and mechanically held in position by means of the ball and socket or some other form of attachment. And the still further perfection of this nearly ideal plan calls for the adjustment of each saddle and attachment together in the mouth and taking a compressed modeling compound impression of them investing and uniting them with solder. With the saddle and attachment on one side united repeat the procedure for the other side. In this way we prove each step and the results will always warrant the extra time and labor put into it.

The final adjustment of these pieces to the mouth must not be done carelessly as a splendid piece of work can easily be made into a failure at this stage of the operation. Many of these cases are combinations of fixed and removable parts and unless the fixed parts be cemented positively in their proper relation to the removable part the nicety of adaptation which makes for success will be turned to a misfit and a failure. When the fixed piece is of such a nature that there is any uncertainty about being able to cement it definitely to place the removable piece should be placed in position before the cement sets. This procedure precludes the misplacing of the cemented part in the final adjustment. The saddles must now be tested and any impinging of the soft tissues noted and relieved. The occlusion should be adjusted to comfort at this time also. The patient should be

fully instructed in the removal and replacement in the mouth and a full explanation of any possible trouble that may arise. At this point in some cases we need the full confidence and co-operation of the patient in order that we may not fail even though our work has been well done. The fact that the patient can take these pieces out accounts frequently for failure.

We must see them very soon again after the case is put in and follow it up closely until perfectly comfortable. In most cases, if the work has been properly done there will be but little trouble, but the point I want to make is that we must keep our

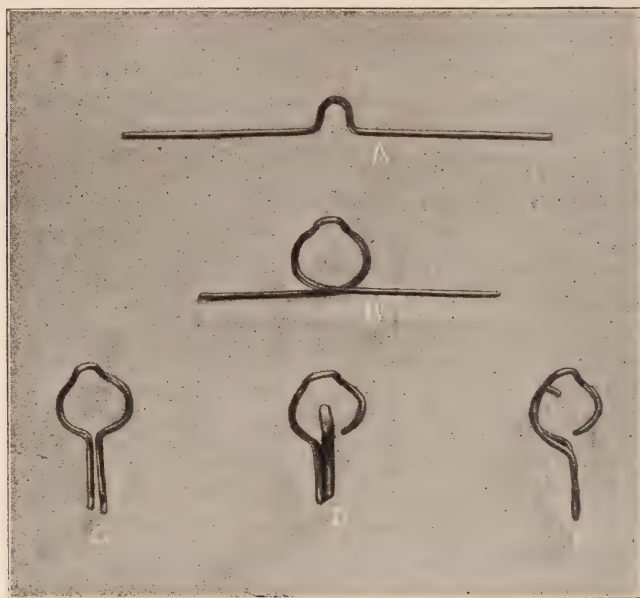


Fig. 1.

patients comfortable or they will become discouraged and quit. Some patients will need a lot of coaxing and encouragement, but when we know the design, the construction and the final adjustment is right we can afford to be both patient and persistent for the reward of successful accomplishment is sure to follow. And from my own personal experience there is no service that we may render for which patients are more grateful.

Referring to the illustrations, I would like to have you understand the application of these two forms of clasps if we do

not get any further than this, because I do really believe that their value is not appreciated. The continuous loop (c) is more applicable to straight sided teeth, such as bicuspid, and teeth that are very short, where other clasps are of no value. The open loop clasps (d) and (e) is a very flexible long spring clasp that will adapt itself to the mesio-distal contour of the teeth. As a matter of fact, the natural anatomical forms of the teeth are

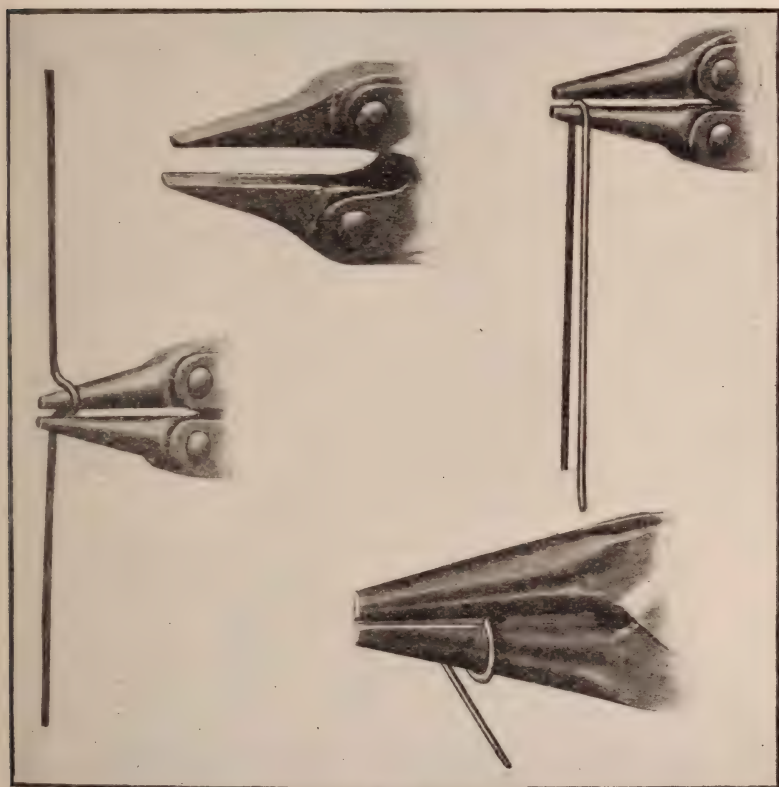


Fig. 2.

such that the gripping power of this clasp, if adapted mesio-distally is very much greater than labio-lingually. With this form of clasp we can anchor to cuspids by gripping them mesio-distally. It grips them at three points, and gets a very secure hold on the tooth.

Slide 3. In this picture we show a modification of the double

bow or loop clasp made by Dr. Royce, and a very valuable modification of the wire clasp adapted to the band clasp. The feature of this clasp is that it is more simple of construction than is a wire clasp, particularly to the individual who has not acquired

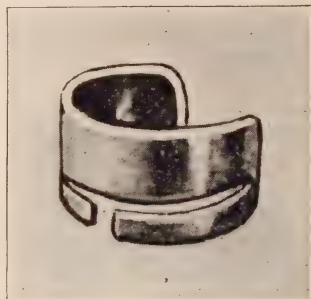


Fig. 3.

familiarity with the manipulation of the wire and has been in the habit of using the band clasp. This makes a very valuable clasp where it is indicated.

There are so many modifications of wire clasps that can be made, and as I have already stated necessarily should be made, that there seems to be no limit to it, but I show here two other modifications of the clasp to give you an idea of some of the modifications that may be made.

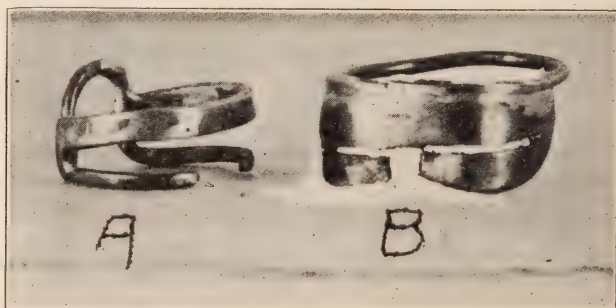


Fig. 4.

In slide 4 (a). We have the open loop on both sides in conjunction with the continuous loop on the upper or occlusal portion of the clasp. This form of clasp I have found to be one of the most valuable clasps for the reason that it eliminates the

necessity for the occlusal stay. The continuous loop part is placed just above the bell of the tooth, and that prevents the clasp from settling, leaving the lower part of the clasp open to extend below the bell of the tooth to grip the more constricted part.

(B) Slide 4. Shows a combination of the band clasp with the loop wire.

Encircling the teeth as they do, these two forms are more applicable to the posterior teeth, and this one (B) is more particularly adapted to the molar teeth. A ring of small gauge wire, number 19 or 20, is particularly suited for this purpose. It

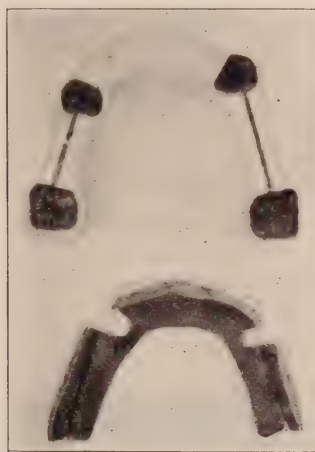


Fig. 5.

is fitted around the tooth above the greatest dimensions and the ends are united with solder, and to that we unite the lower band part of clasp. This makes a very strong, adaptable, flexible clasp with the wire ring around the tooth to prevent it settling down. This is a clasp that is not particularly unsightly, and is not cumbersome, and is very serviceable indeed.

I am going to briefly refer to the use of the alveolar bar splint in conjunction with removable, partial artificial dentures. It is my belief that while this bar splint has been in recorded use since 1889 it has not been made use of as much as it should. I believe that it is one of the most valuable aids in the construction

of partial removable appliances that we have. We gain in its employment all of the good features that are found in the fixed bridge, with the objectionable features of the fixed bridge eliminated, and we gain all the good features of the removable appliance for the reason that the teeth that we are supporting in these spaces are supported in a positive, definite way, equal in rigidity and masticating efficiency to the fixed bridge by reason of the rigid support of the alveolar bar and its abutments. Then we have a decidedly more sanitary appliance. It seems to me it is the most useful form of partial artificial denture we can employ. I show you this picture (slide 5) for the purpose of calling your attention to the first recorded use, so far as I have been able to ascertain, of the alveolar bar splint. This was designed and used by Dr. Parr of New York, and was published in the *Dental Cosmos* in 1889. I was told by Dr. Prothero that Dr. Morrison of St. Louis employed the bar splint in his own way prior to that time, but it was not recorded. The point is that this appliance was used at that early date and its use overlooked until recently. The bar is divided in the center on one side and fits into a groove in the center of the saddle.

Slide 6. This slide shows a case where all the teeth are out except the cuspids. A few scattering teeth in the mouth, when united by means of the alveolar bar splint, will extend the life and

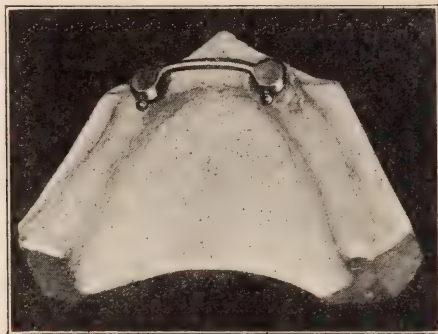


Fig. 6.

usefulness of those very materially. This picture shows the bar connected to the abutments, and the ball and socket attachments extending distally.

In slide 7 we show a lateral view of the alveolar bar splint. I want to call your attention to the union of the bar with the abutment. The point is that the wire should be carried up and attached to the abutments so that we have this inter-proximal space between the attachment of the bar and the abutment.

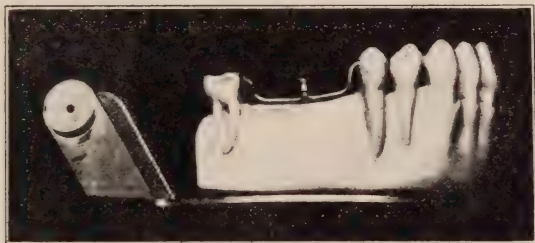


Fig. 7.

Another point in connection with the alveolar bar splint is the reinforcement of the bar adjacent to the abutment. The flexible or movable part of this bar, which represents the length of the bar across the span, is always subjected to considerable strain, so that our reinforcement should be made at this point as a means of preventing breakage. The size and position of the wire will depend on the conditions of the case, usually 13 or 14 gauge. I think better results will be obtained by just having the wire touch the tissues slightly.

Slide 8. This picture shows a typical condition wherein we can advantageously employ the bar splint and fixed construction in the treatment of so many cases that come to us for supplying



Fig. 8.

missing teeth. This gentleman had worn a fixed bridge on each side, and the bridge on the right was ready to fall out when he came to me. The teeth when the bridge was put on seemed to

be firm. The one on the right side was anchored to the first molar and lingual hood on the cuspid. We saved the cuspid, which was somewhat loosened, but I thought it would be a very great loss to lose that tooth. On the left, absorption of lateral root necessitated extraction. The question was how best to supply this patient with teeth. Fixed bridge work at this time was out of the question. To supply an ordinary suction plate without binding together these teeth would mean the loss of the remaining teeth, with the exception of the central incisors and possibly the right lateral, within a very short time. I am fully satisfied that these teeth have been made useful, comfortable and healthy for a good number of years by this plan.

Fig. 8 (a) shows original condition of mouth; (b) the fixed part of appliance in position; (c) case completed.

Slide 9. This picture shows the alveolar bar splint attached to the crowns, with the ball and socket attachment soldered lingually to the alveolar bar.

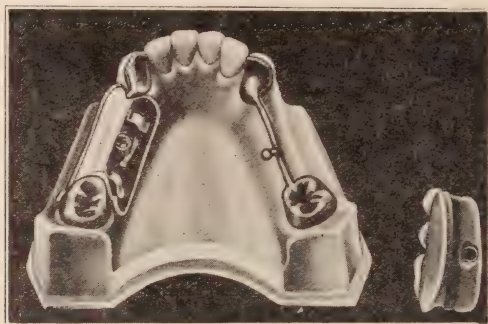


Fig. 9.

Slide 10 shows the means whereby we can preclude the possibility of the breakage of the vertical spur, making a very simple means of attaching the removable appliance to the alveolar bar splint. We show the three forms of the vertical spur. The point I want to refer to with reference to the strengthening of this means of anchoring the appliance is the making of a mortised, soldered joint of the attachment wire to the alveolar bar. We file this bar about half in two (Plate 10a), so that the flat side of the half-round wire will lay in this slot on the bottom side of the wire, thus increasing the surface area for the attachment of the solder; also materially adding to the length of the vertical spur, which in

many cases is a very desirable feature. One wire usually is all that is necessary, and I prefer the half-round to the round or any

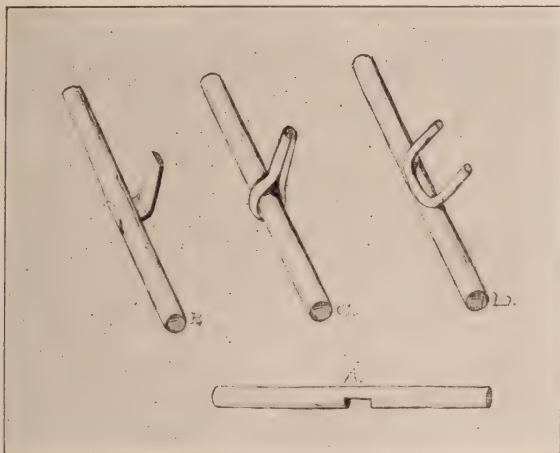


Fig. 10.

other form. That wire, bent lingually from the horizontal alveolar bar, carries it out of the way when setting up of the teeth.



Fig. 11.

Slide 11 shows a recession of the gum. Many teeth that are in this condition can be made useful. To successfully fit a crown

to these teeth is practically impossible, so that I believe that for this class of cases we are not only justified in using the half crown, but it is good practice. I realize that I am advocating a dangerous practice unless carefully and intelligently used, but when used under these conditions it is a very useful and, I believe, desirable form of attachment. After removing the enamel, or as much as possible or desirable, take a modeling compound impression, removing before fully hard, thus securing impression of tooth from its bell to the occlusal. Then make a good model of either Modelite or cement.

A narrow strip of iridio-platinum plate is formed around the model and the projecting ends soldered together. With the model oiled, inlay wax is now melted over and around the iridio-platinum ring previously formed. The iridio-platinum ring prevents distortion of wax while handling, overcomes shrinkage, and the projecting ends afford anchorage in the investment while casting.

I offer this with the hope that it will not be abused in its application.

THE TREATMENT OF PYORRHEA WITH EMETIN HYDROCHLORID.*

BY KENT T. WOOD, D. D. S., MADISON, WIS.

On the supposition that pyorrhea is caused in whole or in part by an infection from *Endameba gingivalis* (Gros 1849), this paper is intended to be a practical working treatment for the disease. It is based on my knowledge today, but I must warn you that in dealing with a medical treatment that is but six months old, the best of today may be succeeded by a better of tomorrow.

The instruments of importance in this treatment are:

Metal self-filling water syringe.

Dentinol or some other treatment syringe.

All glass hypodermic syringe.

Foil carriers (S. S. W. No. 12).

Flexible broach.

Scalers and other instruments in every day use.

The medicines and materials are:

* Read before the Fox River Valley Dental Society, March 9, 1915.

Emetin hydrochlorid aqueous solution 0.5 per cent. (One-half of one cent.)

Emetin hydrochlorid tablets of one-half grain.

Table salt.

Tincture of iodine.

Vaseline.

Cotton rolls.

PREPARATION OF THE MOUTH FOR THE EMETIN TREATMENT.

With one per cent salt solution of a temperature of 115 degrees syringe around and between the teeth, directing the stream under the free margin of the gums and into the pockets. Give the fold of the cheek and lips and under the tongue a fair share of attention. The largest part of a glass of water should be used for this. Then with a pledget of cotton dipped in the salt solution, rub all the surfaces of the teeth that show any coating of soft deposit, paying particular attention to the necks of the teeth just at the gum margin, and remove any large masses of salivary deposit. Then with the floss silk wipe out under the free margin of the gum. This leaves only the pockets to be unloaded of their collection of debris and this can best be done with the cleoid excavators Nos. 121 and 124 where they will reach, and in other places, such as between the teeth, with a cotton wound broach. Now, with a fresh supply of hot salt solution syringe the mouth thoroughly.

It may appear to you that I am placing undue importance on this work of preparation, but I am firmly convinced that great benefit would result from a similar procedure before all operations in the mouth.

I now wish you to consider well the condition resulting from the cleansing of the field of operations with the removal of the masses of infected debris, the washing out of the immense numbers of bacteria, and what is greater than all, the increased blood supply and the stimulation of the tissues by the hot water.

I will say in connection with this that while the spray and compressed air have greater cleansing power than the syringe, the reduction of temperature resulting from this method decreases the resistance of the tissues to the spread of the infection likely to result from operative procedure in the diseased area.

Next in order is the local application of emetin.

The deep pockets are treated by carrying the point of the

treatment syringe to the bottom of the pocket and injecting one minim of the solution while withdrawing the syringe. The shallower pockets can be treated by either one of the following methods:

The teeth of one-third of either jaw are protected from the cheek and tongue by cotton rolls and the gum wiped dry. The closed foil carriers are dipped in the emetin solution and the points then inserted in the pocket and the pliers allowed to open. This will deposit the small amount of solution held between the plier points just where it is wanted. With the less affected teeth the loaded plier points are placed beneath the gum margin and drawn around the tooth, thus depositing the solution just as the ink flows from a pen.

The same satisfactory application will be obtained in the more inaccessible places by wiping the solution in with a cotton wound broach.

When all the teeth in the isolated area have been treated, wipe dry again and apply vaseline with a cotton pellet, or with the finger.

Tincture of iodine is to be used either in place of or before the vaseline in cases of ulceration or tumefaction of the gum margins but should not be used oftener than every second day.

This full preparation and treatment should be repeated every day for from four to eight days, and then at increasing intervals as needed.

After the second or third treatment remove all deposits that are in sight or that can be seen by gently pushing aside the gum tissue and polish the exposed surfaces of the teeth.

At this time any teeth that are not to be retained should be extracted after thoroughly saturating the surrounding gum and to the bottom of the pockets with tincture of iodine.

As the gum tissue shrinks, as it will to a very marked degree, other deposits will come into view and should be removed, with the result of the less affected teeth soon receiving the final polishing of the necks and thus eliminating them from further care.

The deeper pockets will be taken in their turn, scaled and polished.

The subsequent management of these deeper pockets is mainly to keep them clean, washing and wiping out any collection of debris until the pocket is obliterated as far as possible.

The strictly surgical procedure of cutting down of the process

and gum tissue to obtain a condition of permanent cleanliness is not within the scope of this paper.

Thus far our treatment is a strictly dental treatment following principles that have been proved by our years of experience in the treatment of the disease.

It can be undertaken without a positive diagnosis of amebic infection, for if the expected improvement is not seen within a few days, another system can be employed and the work already done will not be lost; for when you come right down to it, our past cures have been largely a matter of cleanliness, as indicated by the drugs that have been used, including everything from turpentine and tan bark to sulphuric acid.

The hypodermic injection of emetin brings us into a broader field and one in which a great amount of clinical evidence must be gathered before its boundaries can be defined.

The diagnosis of amebic infection should be positive and even then it is not certain that it is necessary to use the hypodermic, except to control secondary infection or symptoms.

You must keep in mind that local treatment in the mouth kills only as far as it reaches, so if by hypodermic injections you saturate the blood with emetin to a point at which it is toxic to the ameba, you have killed all that are reached by the body fluids.

The injection is given deep to be sure that it is well under the skin, a satisfactory dosage being one-half grain each day for four days. Treatment to be repeated in ten to twenty days if indicated.

With this hypodermic treatment some very surprising results will occur, about seventy-five per cent. of pyorrhea cases will show constitutional manifestations which they will speak of as rheumatism, neuralgia, stomach trouble, and so forth. Of the cases of arthritis, more than fifty per cent. will show either a cure or marked improvement, and of the neuritic, digestive and anemia cases many will be benefited.

In cases where hypodermic injections are not desired it will be well to try *Alcresta ipecac* in doses of two or three tables, three times a day for six days.

For preventing reinfection, use a mouth wash prepared as follows:

Fluid-Extract Ipecac.....	1 part
Water	4 parts
Alcohol	15 parts

One drop to one ounce of water before retiring at night.

I think it necessary to warn you to be on your guard against the flood of patent medicines and fake preparations that will be offered to the dentists and the public. Use only emetin and ipecac and, for the present, make your own solutions.

There will be a lot of trouble and disappointment from physicians attempting to treat pyorrhea. They are generally so woefully ignorant of the anatomy and pathology of the mouth that they are doomed to complete failure.

In connection with this, I will quote an editorial from the *Journal of the American Medical Association* of February 13, 1915.

ENDAMEBAS AND PUS POCKETS ABOUT THE TEETH.

The recent article of Barrett, Smith, Bass and Johns, Evans, Middleton and others, on the presence of endamebas in pus pockets about the roots of the teeth, the relationship of these to other lesions and the use of emetin in treatment, emphasizes again the need of coöperation between physician and dentist and better knowledge by each of the field of the other. The dentist has not usually been trained to recognize or appreciate the danger of these chronic suppurations to the general health, and the physician, including, perhaps, the bacteriologist, has not made a sufficiently close study of the tissues involved in these suppurations to enable him to draw proper conclusions, especially with reference to the complete cure of such cases under the most favorable treatment imaginable. For example, Bass and Johns state that the periosteum of the alveolus is "continuous with that of the surface of the jaw bone, but it also continues up and covers the neck of the tooth." This statement might lead to the belief that the root of the tooth is covered with a periosteum similar to that of the bone and subject to the same physiologic and pathologic changes. Such is not the case.

It seems desirable to call attention to the peculiar characteristics of the outer hard tissue of the tooth root—the cementum—since a knowledge of the physiologic functions of this tissue, in connection with the changes which take place, as a result of

suppuration, presents the key for prognosis. The dentin, which forms the bulk of the root of the tooth, is covered with a layer of cementum, which corresponds in many respects to the bone. The periosteum which lines the bone of the alveolar socket and the cementum covering the root are connected by many bundles of fibres of the peridental membrane, the ends of which are imbedded in the periosteum and the cementum, respectively. The function of these fibres is to hold the tooth in position and cushion it against the force of mastication. Lying on the surface of the cementum between the ends of these fibers is a layer of cementoblasts, which corresponds to the osteoblasts lying on the surface of the periosteum and their functions are similar. The important difference between the two tissues is that the cementum does not have a blood supply corresponding to that in bone, nor does it have haversian systems.

If we do not fully appreciate this difference, we might naturally expect the same response and the same process of repair in the cementum which occur in the bone as a result of periosteal inflammations. If the periosteum is stripped from the bone, the bone may become necrosed, in which case the activity of the cells within the bone will separate the necrosed area and exfoliate it. Similar changes cannot take place in the cementum because of the lack of circulation of the blood. When the peridental membrane is stripped from the cementum by suppuration, the cementum becomes a dead tissue which cannot be exfoliated, except in its entirety by the removal of the tooth. It is sufficiently porous to become saturated with the product of the suppuration, and remains as a constant irritant to the overlying tissue. Therefore, there is established in each of these pockets a condition similar to that caused by a piece of necrosed bone held continuously in position.

All of the investing tissues of the teeth—the peridental membrane with its specialized cells and fibers, and the bone of the alveolar process—must be considered as tooth appendages, since they develop with the tooth and always disappear subsequently to its extraction. * * * And the bone of the alveolar process at any particular level disappears last, apparently by absorption rather than as a direct result of suppuration. This disease should, therefore, be considered a pericementitis, rather

than an alveolitis. The bone of the alveolus is practically never laid bare by this disease, but is covered by the soft tissue membrane which presents a granulating surface to the root. * *

On account of the foregoing conditions, the word "cure" should be used with caution. Evidently some of those who have been studying these cases have considered them "cured" when no more endamebas were demonstrable, apparently without considering the tissue changes and conditions which prevent the closure of the pocket. A case should not be considered cured when there remains the constant irritant—the denuded cementum—which maintains the harbor for infection. This fact—that such treatment does not result in permanent cure—seems already partially recognized in the present report of Bass and Johns, as they state that reinfection has occurred in about 12 per cent. of cases within four weeks.

It is also stated that a previous injury or inflammation seems necessary "to furnish a kind of pocket." * * * These statements should impress on both dentist and physician the possibilities of greater watchfulness of the gingivae and more careful management of operative procedures to prevent the injury which prepares the pocket for the amebas. The pus pocket is always preceded by a gingivitis which may be so insidious as scarcely to attract the patient's attention.* Most cases may be cured by very simple procedures, if undertaken previous to the detachment of the tissues from the root."

* Or the dentist's.

WHAT IS EXPECTED OF THE DENTAL PRACTITIONER IN THE MANAGEMENT OF FOCAL INFECTIONS?*

BY DR. T. A. HARDGROVE, FOND DU LAC, WIS.

I have been asked by Dr. Stratton to write something for this meeting concerning Focal Infections, as they interest us directly and as we have to deal with them in our daily practice. Focal infections are occupying a position of prominence today because the profession of medicine and the specialties in medi-

*Read before the Fox River Valley Dental Society, March 9, 1915.

cine are tracing the cause of many diseases to infections of that type, many of which are found in the mouth cavity and its adjacent parts.

It is said, and I believe with a great deal of truth, that rheumatism and neuritis are due to such causes as find their origin in infection foci located in the mouth in one form and another; that many of the heart lesions such as myocarditis and endocarditis are but an expression of the same type of infection; and, too, that many of the kidney infections are but another manifestation of the same character of disturbance. It has been said also that infections and diseases of the vermiform appendix, gall bladder, gastric ulcers, and even the liver, spleen and ductless glands generally, may be traced to focal infections if an unhealthy condition of the mouth is ground for suspicion. I have seen one case of thyroid gland infection that could have been traced to the same cause. And, personally I think, that many of the pneumonias are traceable to infections that have entered the system through infected root canals.

Granting that only a part of all these are true, it is easy to see that the oral practitioner is a very important part of the healing science. The dentist is the only one competent to diagnose and decide on the proper treatment, and to administer that treatment when the focal infection is located in the mouth. The physician feels that when he has reason to suspect the existence of a primary focus of infection in our field or to diagnose by exclusion that he can refer his patient to the dentist, and that he can rely upon your findings and treatment. It behooves us to be thorough and accurate.

Working in conjunction with the general practitioner or specialist, as the case may be, to clear up the many obscure diseases that may be disturbing the human family, we fix first a mental picture of a primary focus of infection. And it is well to exercise some degree of imagination as we may find a condition existing with which we are not familiar. A primary focus of infection may be any condition that will permit the constant incubation of bacteria in the body. It is a sort of incubating station, sometimes active, and it may also be very inactive, but never entirely dormant. For if so, it would not be the cause of disturbance. We may get a migration of the actual organism

or its toxins and the character of the pathology that is to follow will be determined by the organisms present and the location of its activity. Strictly speaking, a primary focus of infection after the introduction of infective organism, begins with an embolism. I take it that you are too familiar with the changes that follow this point for me to elaborate further upon this particular phase.

Now, what conditions are liable to interest us directly? Infections in the mouth cavity, jaw bones, alveolar processes, teeth, accessory sinuses, throat and tonsils. That there may be many diseases far removed from the original infection and that, that focus may be located within our field is a well established fact today. That an area of necrotic or carious bone about the apex of a root well or poorly filled, only many times more around the poorly filled roots, may be harboring and incubating bacteria and toxins, only to be carried by the lymphatic system and blood current to other parts where they will find the least resistance and best medium for their proliferation and consequent tissue disturbance, seems a rational line of reasoning and has been clinically proven many times. Microorganisms have a selective ability, especially the streptococcus variety. One strain may select for its activity the surface of the mucous membrane, another may attack the blood elements, another the heart, and still another may be responsible for certain forms of pneumonia.

Physicians and surgeons have been finding pus organisms in the urine of patients suffering from infections, and many times when the only lesion that could be found was located in the jaws and teeth. One such case came under my notice. A young man fell from the top of a cement silo upon the cement floor, receiving some twelve or fourteen fractures among which were two fractures of the lower jaw. I was called into the case with Dr. Twohig and wired one fracture through the body of the bone, as it was behind the teeth, and the other fracture was taken care of in the usual way. The patient made a good recovery but as in many cases of jaw fracture infection occurred, which, while it retarded the union, did not prevent a perfect result so far as the proper union of the bone was concerned. But he did develop pus in the urine that lasted for about ten days and caused a temperature and general disturbance. The physician was suspicious of a fracture of the patella as the location of the focal infection and opened it to see, but found no pus and

closed it again. I only mention this case to show that an infection in the kidney may be due to an infection in the mouth.

I have at the present time a patient who has a leak in every valve of the heart, so his physicians say, and I am carrying on a slow extraction so as to neither shock the patient nor to stir up a focal infection that may do great harm. This patient has pyorrhea and a blood pressure of 200.

I can recall at this time another patient who is suffering with myocarditis and I found an infection in the antrum. The antrum is well now, but the patient is not so far as the heart is concerned, but is better than she was. I can mention also a case of rheumatism that after I had treated the pyorrhea, and I did not use emetin hydrochlorid either, the rheumatism disappeared.

You must not forget that while your training has not in some cases been as extensive as the physician, yet by virtue of that training you are a physician, and will be expected to reason from that angle as well as from the dental or oral training, of which you are an expert. Any specialist in medicine should, if he is going to be sure of his findings, be able to examine at the junction points over into the other specialist's field and be able to determine whether it may or may not be a contributing factor in the condition complained of. You should then be able to examine the nose. It will help you to determine whether there is pus coming from the sinuses, particularly the antrum, the proper drainage of which you are most competent to establish.

Then you have the alveolar abscesses with fistulous openings, blind and cold abscesses, as they were called, not a beautiful nomenclature, but somewhat expressive and a true type of focal infection. Caries and necrotic bone, deposits of mercury in the bone and process, impacted teeth, with infection about them which may cause spasms of the muscle or rather a fixation. And to aid you to make a diagnosis in such cases the X-ray will be of great assistance. But be sure that it is well made and well read by a reliable man. Another good method is to pass a long needle into the place suspected, and if the bone is diseased it will pass without great resistance. Cysts, while they may many times retain physiological contents, may also retain pathological contents.

We must use every means at our disposal to protect our patients from unnecessary loss of teeth. Do not extract teeth if you can

remedy the condition as well by curetting and drainage or by root amputation. And I am not one of those who believes that the simply smoothening of the end of a tooth, that has been bathed in pus for a long time, will make as good a recovery as if the end were entirely removed. The dentinal tubuli are found to be filled with bacteria and may act as a primary focus of infection.

I want to relate a case that was interesting. The complaint was a fixation of the masseter muscle due to an infection in the tonsil. I relate it only to show that when you know you are right it is well to adhere to your diagnosis. I pronounced it due to an infection of the tonsil, but the tonsil did not appear infected. But I was positive it was not located in the teeth and jaws. The patient had been examined by two very competent oral surgeons as well as by a number of physicians and all said that the diagnosis was wrong. The patient finally returned to me and we administered an anesthetic, then forced the mouth open with a retractor and an incision into the tonsil released a quantity of pus and the spasm was gone. I trust that you will not judge me egotistical. I am only reciting an experience like many of you may have had. The point I am trying to make is that we will be expected to say when the teeth and jaws do not harbor the infections as well as to find and treat them when they do exist. A tooth may be the primary focus of a tetanus infection and if you could diagnose and remove the whole field entirely early enough, you would eradicate the disease.

But I must not forget to mention pyorrhea alveolaris, which is said today to be due to the endameba buccalis and the cure of which you may be able to accomplish in about three days by the use of quinine, ipecac, or emetin hydrochlorid in proper doses. I believe you can accomplish the same thing with guaiacol. I have been prescribing a preparation called eckinol for years because it contained guaiacol. However, as there is a special paper on that subject I will pass it, though I dislike to without more attention, as I can now say with a great deal of support that it is responsible for more systemic disturbances than any other phase of pathology.

Recently Dr. Connell, of Fond du Lac, Wis., refused to treat a case of gastric ulcer without first having the teeth and mouth put in a healthy condition, emphasizing the statement over again, like Rosenow has demonstrated, that gastric ulcers are due to strepto-

coccus infection and that the pyorrhea the patient had in that case was responsible for it.

We may find the ducts of the parotid, submaxillary and sublingual glands partly or entirely obstructed and the gland acting as a focus of infection. To emphasize the importance of diagnosis I will cite a case referred to me that was diagnosed as an obstruction due to malignant affliction of the parotid gland. I passed a long, smooth needle into the duct and an examination of the contents proved that there was no infection. It was a cyst outside of the gland and an external opening cured it.

We must be able to distinguish between what may be designated as true pyorrhea and specific or syphilitic pyorrhea and mercurial tissue disturbances. Recently a physician called on me to see if he did not have pyorrhea. And when I asked him if he had not been taking mercury, he said he had been taking calomel. And that is another condition resembling pyorrhea. The physician did not have syphilis. But you get during the administration of mercury a sort of ulceration of the margin of the gingiva, due to deposits of mercury in the alveolar process which receives its infection from the organism that infest the mouth constantly. And if you are not careful you will be treating the patient for pyorrhea and do more harm than good.

Usually the odor will assist you to diagnose the condition. And the treatment will consist of elimination by the use of salts and a local application of a weak solution of hydrochloric acid or anything that will have a chemical action on the mercury so as to dissolve it and the use of an antiseptic mouth wash.

What else can we do to aid preventive medicine on its excursion of health giving? We can avoid many of the things that lead up to the causes. First, be more aseptic and antiseptic. Be more surgically clean, both in the sterilization of instruments, field of operation, hands of the operator, assistant and materials. Boil everything you can for twenty minutes. And when I say materials I have reference to root canal filling materials. What good does it do us to be careful as we may if leading up to the point we place in the canals of the tooth a gutta percha point that we are not sure is sterile? And it will do no good to seal in an antiseptic as when we do we are liable to use oxapara or some preparation containing formalin, which, when used without judg-

ment and in a way that it is not indicated may produce the very thing we seek to avoid, a primary focus of infection. I will venture to say that Dr. Federspeil has enucleated a good many cysts which were the result of injudicious use of formaldehyde or oxapara. I would prefer to be sure that I did not seal in an infection than to place an antiseptic in with it and expect a perfect result; we will be less liable to have infection.

Preceding the introduction of gutta percha solution, when I use that form of root filling material, I place in the tooth tincture of iodine enough to fill the canals and part of the chamber. It has a penetrating property and it is easy to fill the root canals with iodine as it displaces the air readily. Then when you place the gutta percha solution in the tooth, being heavier than the iodine, it will go to the bottom and the iodine will rise to the surface. You will not have great trouble filling root canals in that way. Of course, you will have to be careful not to use the iodine in the anterior teeth, however, I am not sure that iodine will permanently stain a tooth. But a better way is to use Dr. Callahan's method of root filling with which I am sure you are familiar. And a better way still is to keep more pulps alive.

Treat the teeth of children early, correct irregularities and deformities early. Learn to be familiar with the microscope and know the character of suspicious specimens as it may aid you to prevent pyorrhea. Be competent to make urine analysis, not that you will practice medicine, but to be sure of diagnosis. For instance, a patient with diabetes will present himself for a large number of extractions and the condition of which he complains may be the beginning of the end. And the wound remaining from the extractions may never heal and your patient, if you have extracted a great many teeth, may go from bad to worse and death will follow, where if you knew of the diabetes you would extract only one or two teeth and take proper care of the wound and refer the patient to his physician for treatment and life would be prolonged.

We should be familiar with blood pressure findings. And I can cite this case to prove that. I am extracting teeth now for a patient who has a blood pressure of about 200 and a hemorrhage always follows, which will not subside until the patient is at rest. Suppose I would use a local anesthetic containing adrenalin of

which we are using so much today. It has the property of raising the blood pressure and a very bad hemorrhage if not something worse would result. And by knowing the condition I am able to protect the patient.

I am striking out in this way because the practitioner is changing his methods or at any rate his conscience is changing if his method is not. A great deal more will be expected from us and in the future I can conceive a specialty in medicine with a knowledge of the whole subject so great that the imaginary line that we now think we see will be entirely obliterated so far at least as knowledge and ability are concerned.

NOTES FROM THE SURGICAL CLINIC OF DR. TRUMAN W. BROPHY.

REPORTED BY EARLE H. THOMAS, D. D. S., SUPERVISOR OF CLINIC.

Case 108, Miss M. O., age 10; presented with an enlargement of the left side of the face over the area of the buccal surface of the body and ramus of the mandible and even posterior to the angle (Fig. 1). This growth had started six months previously and it was getting progressively larger. About one month before the lower left first permanent molar had been extracted as it was badly decayed and was thought to be the cause of the condition. However the growth did not stop but kept increasing in size. There was no pain nor inflammation of any kind connected with it. An examination showed the swelling to be very hard with no fluctuation and it was diagnosed as an osteoma and an operation was decided upon to remove it.

It has been customary among surgeons in the past to make a two or three inch incision on the outside of the face along the inferior border of the mandible in cases resembling this but such a method is practically always followed by an unsightly scar. The Platysma Myoides is necessarily divided and there is retraction of this muscle allowing the cheek to stand out. There are also adhesions of the area of the incision to the bone resulting in a depressed immovable surface which prevents nearly all motion of that side of the face. Therefore knowing

all this it was decided to remove this growth through the mouth and thus avoid such a disfiguration. It is much more difficult to do an operation of this kind in the mouth but after all it is worth while; for what is our duty as surgeons? Is it to do the operation which is easiest, or is it to do the operation which promises most perfect results for the patient, no matter how hard and painstaking the task?

Accordingly, with the patient anesthetized, an incision down to the bone was made through the whole length of the bucco-



Fig. 1.

alveolar groove from the cuspid posteriorly. The periosteum was then dissected away from the body and ramus of the mandible on that side, exposing a bony growth covering that whole area and even extending around the angle and posterior border of the ramus to the lingual surface of the bone. This excess bone was then removed with chisels and large burs until the mandible was brought down to normal size and shape. The periosteum was then laid back against the bone and held

there tightly by means of a compress bandage. The parts were irrigated every second day for two weeks by which time the whole area had nicely healed. For a few days the face presented the same swollen appearance as before the operation due to the inflammatory infiltration. If a compress bandage had not been worn this probably would have organized in this position and remained. The compress bandage pressed the tissues down to the normal size in a few days in which condition they have since remained.



Fig. 2.

Fig. 2 was taken about three weeks after the operation and shows the splendid result with the absence of any disfiguring scar which would have been a source of mental distress to the girl for the rest of her life.

Case 106, B. K., age 5; presented to the clinic with inability to move the mandible. There was ankylosis with firm occlusion. She gave a history of having had the left temporo-mandibular articulation operated on twice for an abscessed

condition of the same same about eight months previously, soon after which the above described condition of ankylosis developed.

It was diagnosed as a case of false ankylosis due to adhesions around the joint. The patient was anesthetized and the teeth of the upper and lower jaws were carefully and forcibly separated by means of mouth-gags applied to both sides at once. A mouth-prop was then fashioned out of wood and placed between the anterior teeth to hold the jaw open and thus to avoid adhesions around the joints from contracting. This was



Fig. 3.

worn for about one month and a few times each day it was taken out, active and passive movements of the jaw being instituted to retain the function and nourishment of the muscles of mastication. At the end of one month the prop was dispensed with and the the child could then open and close the mouth as it normally should.

Fig. 3 shows how far the child can now open its mouth, where previously it was in tight occlusion.

Case 126, A. D., age 13; presented to the clinic on January 5, complaining of a large growth on the left maxilla including all the teeth to the median line, Fig. 4. The teeth on that side were practically covered over by the growth which was of a



FIG. 4.

dark reddish purple color, with signs of degeneration and breaking down on the surface. The size at any one place could be markedly reduced by pressure which would also blanch the tissue for the instant. As soon as the pressure was removed,

however, the growth would instantly regain its former size and color. The growth was irregular in shape and had first been noticed one year previously. It had been operated on about two months after having first been noticed but it had since recurred and grew to the present size. At no time was there any history of pain. There was also present a large nevus covering almost half of the area of the boy's face.

The tumor was diagnosed as an angioma and microscopically there were found to be present slight traces of sarcoma cells. The boy was given a general anesthetic, ether, and the growth and all the teeth posterior to the cuspid including the contiguous bone were removed, exposing the floor of the antrum throughout its whole length and also exposing the crown of the unerupted third molar. This molar was left in position as it appeared fairly firm. The bone through all this area was very soft and of a honeycombed nature—hence the reason for its removal. As the cuspid and teeth anterior to it were very firm it was decided to try and save them, but all the tissue including the periosteum over the labial and lingual surfaces of their alveolar processes was removed exposing all the bone and leaving both centrals and the left lateral and cuspid protruding from the exposed bone like the teeth in a skull.

Two days later the posterior part had started to heal and all this exposed bone on the anterior had become covered with a gelatinous exudate from the bone itself. By one week later the posterior part had almost completely healed and the bone of the anterior part had become covered with a very hyperemic tissue of a glaring scarlet color which disappeared on pressure. Two weeks after the operation the posterior part was completely healed but in the anterior part the growth had recurred to quite a size, with an irregular cauliflower surface covered with a thin layer of white degenerated tissue which when removed revealed the peculiar glaring scarlet red color of the growth.

As the growth appeared to be composed mainly of blood vessels it was decided to try the effects of astringents upon it. The boy was given a small bottle of twenty per cent tannic acid in glycerin and was instructed to saturate some cotton in this and to lay it between the growth and his upper lip, to keep it there at least five minutes, and to repeat this about six times

every day. After one week of this treatment the growth appeared considerably reduced and after three weeks the tissues had assumed normal size, but the peculiar color still remained. When seen two months after, the tissues appeared to be still normal except for the peculiar color.

One thing illustrated very nicely by this case is that it is not necessary to preserve the periosteum over the bone of the jaw to maintain its vitality, since it has plenty of blood supply through its porous internal structure. In this way it differs markedly from other bones throughout the body.

The foregoing result coupled with successes in similar cases bring us to the conclusion that when the periosteum of the jaw bone becomes detached in any way it does not necessarily mean that the bone will die, but if kept clean will usually live, barring other complications.

A CASE OF IMPACTED CUSPID.

BY DR. GEO. H. BELDING, MILWAUKEE, WIS.

Patient, a young man 27 years old, presented some time in July, 1914, complaining of pain and explaining that pus had been discharging for four or five months through a small opening in close proximity to the apical end of first upper left bicuspid. The history was that the cuspid tooth on this side had not erupted. The bicuspid showed no signs of disease, but in order to get into the maxillary sinus, from which the pus came, I extracted the first bicuspid and found it free from disease. The antrum was syringed out daily for about four months, using on alternate days glyco-thymaline and normal salt solution, and a bridge made to replace bicuspid tooth, and the patient dismissed as cured.

Patient again appeared at my office in March, 1915, complaining again of pus pouring out. At this time I removed the bridge and cleansed the parts as well as I could, and being at a loss to know wherein lay the cause of the persistent pus formation, I had an X-ray made by Dr. E. J. Eisen, and the picture here shown revealed the cause of the trouble.

The cuspid was removed by Dr. G. V. I. Brown through an enlarged opening of the antrum and the wound is now almost

healed, four weeks after the operation, with no discharge of pus.

This case impressed me with the importance of X-ray pictures



in much of our dental work where abnormal and diseased conditions exist not easy to diagnose.

ARTICULATION OF TEETH.

BY DR. L. P. HASKELL, CHICAGO, ILL.

It is strange that dentists writing upon the arrangement and articulation of artificial teeth do not recognize the different conditions existing between the natural and artificial teeth.

In the first, teeth fixed solidly immovable in the jaws; in the second, movable plates, especially in the vast number of lower jaws, with flat conditions existing. Then again the changes taking place in the maxillary tissues, owing to pressure and other conditions, so there is such a lack of stability that it is utterly futile to

attempt to articulate artificial teeth, especially the anterior, corresponding to nature.

And yet elaborate articles are written, largely illustrated, showing the occlusion of the natural teeth, especially the anterior, and in close contact by grinding the incisal edges, as nature has worn them. Combined with this are illustrations of the swing of the lower jaw, all of which is valuable as illustrating nature, but of no use in the case of artificial teeth.

And I will say that no dentist who has worn for ten years full sets, or especially upper and partial lower posterior, would even advise such methods.

After seventy years' experience exclusively in artificial dentures and many years full upper and partial lower, and twelve years with flat edentulous lower jaw, I may presume to be able to discuss this subject.

Take, for example, the full upper and posterior lower teeth. It is the invariable rule that, owing to the pressure being exclusively upon the posterior teeth and the most forcible, and also that from some cause more absorption takes place upon the lower jaw, it is often the case that within six months the pressure is strong on the anterior teeth, resulting in displacement of the upper teeth and causing an undue pressure on the anterior margin of the upper jaw, resulting in a flexible ridge which is so common. In these cases the posterior teeth should be made long and the anterior have sufficient overbite so there can be no pressure there.

Then in case of full upper and lower dentures, the same rule should apply of *no occlusion* under any conditions whatever on the incisors in order to avoid trouble.

The pressure should always be on the bicuspid and first molar; none on the second. This applies especially in case of the flat lower jaw, which is one of the serious problems of the dentist.

Another point largely overlooked is this: Why, unless under favorable conditions, cannot the patient masticate tough meat or other substances? Simply because they require the grinding process and this is impossible except in favorable conditions, so the "three-point contact" is of no avail.

There are more failures from faulty occlusion than from other causes, and occurs oftener in the interference of anterior teeth than elsewhere.

PROCEEDINGS OF SOCIETIES.

AMERICAN DENTAL SOCIETY OF EUROPE, FORTY-FIRST ANNUAL MEETING, HELD AT PARIS, FRANCE, JULY 30 TO AUGUST 1, 1914.

DISCUSSION OF THE PAPER BY DR. SPRING, "THE CORRECTION OF INFRA-OCCLUSION."

DR. E. A. BOGUE:

Said he was interested in the paper because it recalled to his memory two cases of his own, the one a little child as long ago as 1880. The child was treated exactly in the way Dr. Spring had shown, excepting that the plate was attached to the lower incisors. At that time nothing was known about intermaxillary rubbers and the case proved exceedingly difficult, but it was finally brought to a successful result. The second case was that of a married lady of about 30, whose lower incisors were biting into the gums above. The only safety lay in spreading the teeth apart to take up some of the room of the teeth that had been lost by the extraction of the four first molars. He found the beginning of proximal decay in practically all the grinding teeth, and after wedging them apart and putting in what was called at that time contra-fillings, he had the great pleasure of finding that she no longer touched the gums. The lady was still a patient of his and had now twenty-seven grandchildren. The lower teeth had never again bitten the upper gum. Both those cases were cases of too small an arch. He had found it quite possible to file down, at least temporarily, the necessary teeth, but he desired to take issue with Dr. Spring in regard to the statement he made in connection with the distal position of the mandible. He himself did not think the cases arose because of the distal position of the mandible, but because of the distal position of the teeth in the alveolus. Dr. Talbot had once claimed that the absolute change of occlusion, what Kingsley called jumping the bite, never took place, but Dr. Davenport and himself were able to show Dr. Kingsley cases where it had taken place, and then Dr. Kingsley wished to know how it occurred. Dr. Kingsley being perfectly in earnest in asking his question, he told him that the change was a change in the position

of the teeth and not in the position of the mandible at all. The lower teeth had been drawn forward and the upper teeth pushed backwards, and there was now a new articulation. With full circumference of the grinding teeth the arches would articulate correctly and there was no biting up against the gum.

DR. FERRIS:

Said that in the United States orthodontists had abolished the inclined plane and the biting plate in the interests of function, for the development of infra-supra-occlusion, and had utilized a simple principle which worked upon the individual region of the mouth where the change was desired. He himself used a little pure rubber block and, with the intermaxillary forces in operation, the biting block to hold the teeth apart was unnecessary, provided the molars were made to bite upon the rubber block or any hard object. He gave the little rubber block to the child and instructed the governess or mother that the child was to masticate upon it, with the teeth that he required to move, about ten or fifteen times each day. Anyone who had never bitten upon any particular object that number of times would be surprised at the effect on the gum tissue and circulation. In the course of a couple of weeks the teeth would fairly jump out of their sockets. It was loss of function that caused the lack of development and the little trick he had mentioned would work very satisfactorily; in fact, he was regulating some cases without any mechanical appliances whatever in certain families and getting excellent results.

DR. I. B. DAVENPORT:

Said his best success was finally achieved after his brother came with him and devised, simultaneously with Dr. Ainsworth, the biting guide, which consisted simply of an inclined plane soldered to two or four front teeth on which the incisors were biting. That, in the majority of cases, would not only drive down the incisors, but equalize the entire arch, and in many cases no spreading was required and no other appliances need be used.

DR. SPRING:

Said he recognized there were differences of opinion on the subject of whether it was a movement of the teeth in the alveolus or a movement of the mandible forward. He believed it depended on how the work had been done. In one of his early cases, by the

constant application of the intermaxillary rubber, he believed he did move the lower teeth forward in the alveolus and accomplished just what Dr. Bogue had said was accomplished in every case, because the chin of the patient, which before the operation was very far back, was still so after he had got through. He believed if one secured alignment before beginning too much in the way of bringing the lower jaw forward, it would then be possible, by applying the intermaxillary arches, to bring the lower jaw into the forward position and accustom it to stay there. The case he had referred to was that of a child of 10. The whole of the lower jaw was too far back and he believed the chin had now really been brought forward. The difficulty was that after the alignment had been secured the back teeth did not touch when the incisors were in normal position, and until the biplane was placed in it was a very awkward situation. He secured the alignment of both the upper and lower arches at the same time and, therefore, when the intermaxillary rubbers were in place the lower teeth were retained. The case went on with an occasional visit once a month or so, until it was found that the molars and bicusps occluded correctly and the lower jaw could come forward to its position with perfect ease.

DR. BOGUE:

Said the biplane, as Dr. Spring called it, was developed by Dr. William Davenport and would do its work most effectively when the glenoid fossa was shallow enough to admit of it, but when age had altered the glenoid fossa then only the teeth could be moved and not the jaw.

DR. SPRING:

Said his only difficulty in the use of the biplane soldered to the upper incisors had been that in some cases the lower incisors had been held forward and separated from their relationship with the rest of the lower teeth, and the jaw had gone back.

DISCUSSION OF THE PAPER BY DR. CHIAVARO ON "THREE RARE CASES OF REPLANTATION OF TEETH."

DR. W. J. YOUNGER (Paris):

Said he had had a good deal of experience in replantation of teeth and looked upon Dr. Chiavaro as his pupil, and consequently

took a little credit for Dr. Chiavaro's success. In the treatment of fistulous openings in the face, it had been his custom to cut right down past the sinus, so as to separate the sinus in the soft tissues from that in the jaw; then he used a plate of lead to keep the two separate and treated the sinus in the jaw, at the same time treating the opening in the face, and he obtained a very good result without any scar. In the treatment of loose teeth, where the pulp had died and the tooth had been perfect, it had been his habit to extract the tooth, polish the end of the root, take out the dead pulp and disinfect and then put the tooth back again. He performed that operation on a right central of a young lady. She had lost a cuspid and a lateral, and the tooth had dropped in so that there was contact between the central and the first bicuspid. By the use of springs he lifted the teeth over until he had room enough for a lateral and a cuspid. In the course of the work the right central died. There was absorption at the end of the root. He removed the tooth, polished the root, sterilized it, and put it back, and the tooth had now been in for about nine years. He had done the same for a lady of 36 seven years ago, and the tooth was in excellent condition now.

The President asked whether Dr. Younger had replanted molars.

Dr. Younger said he had. The young lady to whom he referred had had three implantations of incisors which were extracted by a dentist because he could not cure pyorrhea.

The President said he had had the pleasure of seeing Dr. Younger's case and it was very interesting. He himself had also replanted two molars in that mouth.

DR. OSCAR AMOEDO:

Said he had devoted a good deal of attention to the operation of replanting teeth since 1886, when Dr. Younger came to New York, and had done a good deal of implanting. He did not think it was quite justifiable to extract a tooth because there was a fissure hidden in the chin; the tooth should be kept in place. There were failures in doing so, but every dentist ought to begin by treating the tooth and endeavoring to keep it. By the simple little operation of drilling through the alveolus and removing the tartar from the tooth, many cases could be treated without submitting the

patient to such a big operation. It was well known that teeth treated in place would live during the patient's whole life, while a replanted tooth or an implanted tooth had a very limited life. His statistics induced him to give about four years as the average life of a replanted tooth. He thought Dr. Chiavaro took too much trouble in the operations, which he believed could be done more easily by a retaining wire behind the teeth. There was no need to raise the articulation on the one side for biting. He had seen two or three cases of replanted molars, but he believed they lasted even a shorter time than a single-rooted tooth.

DR. W. M. SPAULDING:

Said since he had been in Europe he had replanted teeth after extraction in twenty-eight cases, but had always done it immediately and had not left the cases, as Dr. Chiavaro had done, for any length of time. Out of the twenty-eight he had only two failures, and he had seen the cases regularly during the last twenty years. In connection with Dr. Chiavaro's second case, there was a slight recession of the gum, but the doctor said nothing about suppuration. If the case was looked at carefully it would be seen that it was only a wound to the pericemental membrane from the extraction. With regard to the third case, the extraction in the presence of pus, in 1907 he operated before the Society of French Dentists at Bordeaux. He took the tooth out, cleansed away the pus, and immediately put the tooth back. He watched the case for fifteen days afterwards and it was a perfect success. It was a left lower second bicuspid where the molars were missing. For ligaturing the tooth in place he used only silk, which he allowed to remain only for two or three days. He had had three cases of molars. The first was a left upper first molar, crowned. There was a bad abscess which he could not get at without tearing the crown to pieces, and he knew that the tooth had been entirely built up with amalgam underneath. He decided to extract the tooth, having told the patient previously that it might be a perfect loss. Once he had the tooth in his hand curiosity led him to attempt to put the tooth back, and it stayed in the mouth for eight years and was taken out by him about two months ago. Of the other cases one was a left lower second molar and the other a right lower first molar, and they had been both in the

mouth now for over five years and were both perfectly healthy. The teeth were damaged by perforations between the roots in trying to treat the canals, and abscesses were set up, and the only way of curing the case was to take the teeth out, stop the hole, and put them back again.

DR. CHIAVARA:

Said he had heard some very important arguments and on his return would work again on the subject and hoped some time in the future to be able to submit some further notes to the Society.

CHICAGO DENTAL SOCIETY.

A regular meeting of the Chicago Dental Society was held in the University Building on Tuesday evening, February 16, 1915, at 8 P. M.

The President of the Society, Dr. T. L. Grisamore, occupied the Chair.

Dr. F. E. Roach presented a paper on the subject "Why Removable Bridgework Fails."

DISCUSSION.

DR. G. W. DITTMAR:

The paper and lecture to which we have just listened was most excellent, dealing as it did with a subject which is very interesting to most every dentist. Situated as I am, I have an excellent opportunity to see what Dr. Roach does in his practice. I have seen many cases of removable partial denture construction both in the form of bridges and plates that are very successful and beautiful in construction and I can say that the technique as described and shown here this evening, coupled with the principles described, produce efficient and esthetic prosthetic appliances.

The essayist did not say much about the causes of failure, but rather emphasized the essentials necessary for success. I will speak of one condition where the advantages of removable appliances are marked and that is where there has been considerable absorption. If fixed bridgework is placed in such cases it is practically impossible to obtain the desired restoration and esthetic requirements, this can easily be done with a removable

appliance. Other advantages are ease of repair or alteration when occasion requires—more cleanly or sanitary and less strain on the anchor teeth, if properly made, than will be produced by fixed bridgework, though there is no way of restoring to usefulness and comfort mouths where fixed bridges are indicated equal to a properly constructed, securely anchored fixed bridge.

Regarding the alveolar bar this is an excellent means of splinting teeth loosened by absorption or other cause, and if securely held in position after the necessary treatment to restore the diseased teeth to health, greatly benefits the weakened members by its support.

I agree with what the essayist said regarding the attachment of this bar to the anchor teeth, i.e., the crowns or inlays—this attachment should be very secure and so formed that proper clearance be had under the bar next to the crown or inlay.

The new ideas presented in the technique used in the attachment of the uprights to the alveolar bar are simple and novel and to my mind a decided improvement over the older technique.

I agree with practically all the essayist said regarding the various forms of wire clasps. They are a very effective means of attachment to vital teeth—the only question I have is, in the “open loop” forms, whether the gauge of wire is heavy enough as a rule, 18 and 20 gauge wires are rather thin and I fear will cause trouble by breaking.

Of the various forms of manufactured attachments I believe the ball and tube form—the “Roach attachment,” to be the best. There is no form of attachment in use today that has the numerous advantages that has this attachment, and yet many men have failed because they seemingly did not know how to use it. The ball should be soldered to the crown or inlay—do not cast onto it. The small end of the shank of the ball part should either be cut off or a hole drilled into the crown or inlay to allow this constricted part to go entirely into the crown or inlay and then be securely soldered to place as near the gingival as is consistent with the soft tissues—usually somewhat lingually of the center on the mesial or distal surface—it should never project lingually. The tube must always be soldered to its support, use 18k. solder; never cast onto it. Clasp metal wire or plate is best for this purpose, which may project into the

vulcanite or be soldered to a metal base. Where there are no distal teeth or crowns to be clasped or no alveolar bar; in other words all the molars and possibly the bicuspid gone, the tube of the Roach attachment must be modified by soldering a clasp metal wire about 16 gauge, slightly flattened to the side or distal part of the tube so that one end will project into the vulcanite or be soldered to the metal base and the other part so bent that the end will have contact with the distal of the tooth as near the incisal or occlusal as the occlusion will allow. A strip of clasp metal plate, 24 gauge may also be used for this purpose. Care should be exercised in soldering the tube to this wire or plate not to flow an excess of solder over the tube—use anti-flux to prevent solder flowing where it is not wanted. The function of this slightly flattened wire, or plate, having contact near the disto-incisal or occlusal of the anchor tooth, with the tube grasping the ball which is soldered near the gingival of the same tooth will as a consequence keep the distal part of the plate in contact with the soft tissues.

DR. K. G. KNOCH:

Mr. President, Members, Ladies and Gentlemen, my experience has been largely in mouths where the work I have had to do is post-pyorrhea, and the few things I want to emphasize are not questions of detail but merely questions of principle in the matter of restorations of this kind.

The first principle that I want to call particular attention to is that of splinting. Our work should absolutely conserve the remaining teeth. For that reason we should have a splint effect that does not put on the tooth an undue leverage.

The proof of our contention as to the necessity for the splinting action of work placed in pyorrhea mouths, is shown definitely in cases where the treatment has been completed and no definite result obtained until an appliance has been placed, which absolutely splints the teeth affected.

I showed at a clinic a few weeks ago a case of pyorrhea induced by mal-occlusion. Somebody had put into the first molars occlusal restorations made somewhat after this fashion: Retention pits were cut in the mesial distal labial and lingual pits and the gold malleted between. That left in the molars no occlusal restoration. The teeth began to drift. This case had

been treated and treated by several men repeatedly with no definite results until those fillings were taken out and replaced with deep pitted, well margined inlays, and then restoration made of these teeth, badly out of line, splinting them in with a removable bridge. At once the result of instrumentation was apparent.

In the first place I believe our ideal in the mechanical restoration is a removable partial denture. If we are going to place a removable partial denture in the mouth over the same sort of attachments we have used for fixed bridgework we are going to fail. If we are going to place on teeth large gold shell crowns, large banded Richmond crowns, if we are going to place on those teeth the same sort of attachments we have used in fixed work, we are going to fail. In other words, if the foundations we use for removable partial dentures are to be made in the same manner that has so largely brought our fixed bridge work into disrepute we will fail. By this I mean the use of the gold shell crown and the banded Richmond crown. I would legislate their use out of dentistry if I had my way.

I know that some men fit bands approximately to the tooth, but the majority never even resemble a fit and I believe an operation that permits of so great a failure, as does the banded crown, has no place in our profession. Unless we use some sort of root attachment that conserves the tissues I believe we are going to fail.

In regard to cutting off the crowns of teeth, I will say a few words. I believe that any portion of the tooth that by its presence, qualifies a successful result in our mechanical restoration should be removed, so that the remainnig portions can be utilized to the best of ability. In many mouths where pyorrhea has had its fling, the natural teeth themselves, standing as they do, present places that cannot be kept clean, and unless we excise some of those crowns, bringing the teeth into full occlusion, I believe we will fail.

I believe our greatest cause for failure has been the lack of recognition of the fact that the mouth, with its full complement of teeth, is "the organ of mastication." With your permission, I will quote from a former paper.

"I believe one of the greatest reasons for mechanical failures

is found in the neglect to study the mouth in its entirety as an organ. One tooth is treated, or several teeth, and it is felt that everything necessary has been done. In other words, the relation of dentistry to the mouth often is exactly opposite to that of medicine to the rest of the body. Again, why regard simply the mechanical aspect of the work and never think of the physiological relation to the soft tissues, and to the teeth involved? There are men today specializing in pyorrhea who do not supervise the mechanical restorations that are necessary in most of their cases, and who fail many times in their pyorrhea results simply because of their neglect. They refer a patient back to the man who, in the first place, did not believe himself able to subdue the conditions and so all fails ultimately. Dentistry has many branches, but only one trunk, and these men are practicing as if they grew in different forests. They are apart, instead of together, and lessen the chance for the best results by a lack of co-operation. We know that any disturbance in the mouth impairs its functions as a whole. The loss of a single tooth, or the loss of the gingiva and of the alveolar process in pyorrhea, by making it impossible to cleanse the parts, impairs the function of the masticatory organ, which then goes from bad to worse. We know that the digestion and proper preparation of food in the mouth is absolutely vital to its successful digestion in the stomach and intestines; so any disturbance of the first phase means abnormal nutrition. Knowing this we must acknowledge that a preliminary to successful operations in the mouth and on the teeth demands a general recognition of physiologic conditions precisely as in any other operation upon the rest of the body. This must be recognized as the true foundation of operative dentistry."

The point I am trying to emphasize is a plea for comprehensive dentistry, the study of conditions in every possible way, the recognition of all the principles involved, the consideration of all types of attachment, and the application of the best type in each individual case. Dr. Roach was absolutely true when he said that each case presented a new field for our consideration. The surprising results of the application of a definite type of attachments to a number of cases is sometimes appalling. We have made application of certain types that we felt were

applicable to all cases, only to find in the majority of them that they were faulty.

There is one rather popular method of attachment at which I am going to take a fling and that is the extension bar. Nothing could ever exert a greater leverage on a root than an apparatus of this kind and its use will bring upon heads of its users a great deal of embarrassment. I wish Dr. Roach would add his word to mine in this.

Now a word in regard to the saddles. I have given much thought to this. I made saddles originally from plaster impressions and I had re-absorption under them. I then made saddles from models obtained from modeling compound impression and these gave an accurate model of the part and perfect saddles. I then seated these saddles under as nearly the full stress of mastication as I could apply and I began to have success and prevent absorption. I place the saddle to the proper position on the model and wax it heavily to the abutment piece. Then I transfer the whole to the mouth. Every part of the case goes into the mouth. The sticky wax is warmed slightly, and with two fingers the saddle is forced hard into the tissue as hard as I can force it with my fingers. I use two fingers, one on the buccal and one on the lingual so as not to ride the saddle to the buccal or lingual. If I could be sure that I would get it in the proper position by having the patient close his jaws on it I would be perfectly happy, but I am not sure that I can develop technique enough to place it in that relationship without using the opposing jaw to place it. The sticky wax is heated, the pressure applied and instantly chilled with cold water. The case is invested and the saddle soldered to the bar or crown, and tried in the mouth to see whether or not the saddle is exactly where it was waxed.

This method relieves the anchorage roots of nearly all but their individual load during mastication and also stimulates the periosteum of the bone under the saddle and prevents resorption.

DR. HART J. GOSLEE:

I have been especially interested in the presentation of the subject of removable partial dentures tonight, for the reason that I have always been of the opinion that entirely too much "fixed"

bridge work is being done, and anyone who will advocate the building of more removable structures is doing more for the conservation of the teeth and health than obtains from the indiscriminate construction of "fixed" structures.

Had I anticipated being called upon to discuss this subject, and had I had time to make preparation for such discussion, I would have been much pleased to have been able to say almost identically what Dr. Knoche has stated. The successful application of removable structures depends on the conditions presented, and upon making a study of models of the case and planning the work, as Dr. Roach has said, and no one will be able to properly construct a removable fixture of any type unless he has previously studied the case and made up his mind just which type is best adapted to the case at hand. Dr. Roach has referred to several types of attachments. I do not regard any of the types now in use as universally adaptable, and I do not believe he does. I only mention this to show you that in the preliminary study of these cases we must not only decide upon what type of structure we are going to build, but next, and equally important, we must determine what type of attachment we can best use.

One thing that impresses me most forcibly is the use of the alveolar bar. He said that this is not new, but that it has not been used as much as it should have been used, which is true. I have always referred to the use of this principle as "assembled abutments." He calls it the "alveolar bar," which is but a means of assembling your abutments, by which means not only does the maximum of strength obtain in the abutments supporting your structure, but also in the structure itself, and in obtaining a maximum of strength you are relieving each individual abutment.

I regard Dr. Knoche's statement in regard to the relationship between the saddle and the abutment piece as exceedingly important and what he said is absolutely true. If you will observe a procedure similar to the one he has mentioned, you will make the soft tissues do the work required of them, and in proportion as the soft tissues assume some of the work, your abutments are in turn relieved of some of it. In taking the impression of metal saddles, I always put a bar of wood in the mouth and utilize the force of the opposing jaw. Place one end as nearly in the center of the saddle as possible and the opposite end on the teeth in the

opposing jaw. If there be teeth present, all right; if not, cushion this end of the prop with modeling compound and let it rest upon the ridge. If you want to have your prop in the center of a palatal strip, you can place a piece of wood across the occlusal surfaces of the teeth, and in the opposing jaw and from the center of this place a prop to rest upon the center of your palatal strip, and this can be utilized to force it firmly into place by cutting a slot in your impression tray so as to straddle the prop. By this means you can always obtain the relationship between your saddles and attachments before soldering, with the full power of the opposing jaw, which, in my opinion, is exceedingly important.

DR. KNOCHE:

There is one other thing that I would like to emphasize in this relationship. It is this: The emphasis that should be laid upon doing this work under the rules and laws of full anatomical occlusion. Unless you do this you will get leverages that ultimately spell failure. Leverages work the downfall of most of the fixed and removable work that fails.

DR. J. H. PROTHERO:

Mr. President, there are one or two points that came to my mind that I think might be briefly mentioned. The essayist's definition of the difference between bridge and partial denture was not exactly clear to me. The terms that we use in reference to bridge work are based on civil engineering. A bridge is a structure or appliance that is supported at both ends, and the abutments carry the weight, although we sometimes combine the saddle with the work done by the abutments. I think that was his idea, but he did not express it clearly.

The point was not brought out that none of these appliances is intended to sustain the stress of mastication, and none of them is strong enough to sustain the stress of mastication. Dr. Roach's appliances are not, and that is true of Gilmore's, Morgan's and the others. They are only a little clamping device to hold the appliance neatly and comfortably in position against the borders.

There have been some thoughts thrown out that a denture will settle. I admit that there is some danger of that, but if made right it will be a long time before that will happen. If you simply put a piece of card-board over the bar that allows the

thickness of the card-board for the denture to settle. These bars, where they are connected with two or more roots or teeth simply mean multiple anchorage. They are certainly advantageous in all cases, and should be employed wherever possible. In 1885 Dr. Morrison was conducting cases in this manner: He soldered the bar up edgewise so that the denture could be removed, and was showing that with a good deal of pride. In 1889 Dr. Parr illustrated that in the *Dental Cosmos*. I want to tell you that multiple anchorage secured by means of the bar is going to add a great deal to the life of the denture.

Unless you construct your dentures in accordance with the movements of the jaw you are going to have trouble. The contact of two cusps will seriously impair the use of a partial denture. In post-pyorrhea cases the patient is anxious to use the teeth, and they usually go to the other extreme and subject the denture to considerable stress.

DR. H. F. METHVEN:

Mr. President, Ladies and Gentlemen: There is very little that I shall say this evening, but one point I wish to impress upon your minds is that I think it absolutely necessary that cases of removable bridges should be constructed by the anatomical occlusion method, for the reason that in most of the patients' mouths in which removable bridges are placed the patients have lost some of their natural teeth through the ravages of pyorrhea, and on account of the impaired condition of the remaining teeth or roots to be used as abutments and piers, it is paramount that the stress of mastication should be evenly divided to prolong their usefulness.

In my judgment the anatomical method must be thoroughly followed out in its entirety or another failure will be recorded against removable bridge work. I thank you.

DR. ROACH (closing the discussion):

The slide that Dr. Dittmar has had thrown on the screen was prepared to show definitely and positively the wrong way to use the Roach attachment.

I was very much pleased at the liberality of the discussion and I was exceedingly pleased with Dr. Knoche's discussion. I was very glad to hear Dr. Knoche and Dr. Goslee refer to the adjustments of the saddle. These gentlemen have brought these

points out very nicely, and I am glad to have this point of making the saddles carry their own load emphasized. Dr. Prothero referred to the attachment holding the appliance in position, and Dr. Dittmar described the principle of the ball and socket holding the appliance in position. The contact spur is absolutely indispensable. While the ball and socket attachment minimizes the leverage on the teeth, as he said, it only serves to hold the plate in position. The ball and socket appliance throws the strain on the saddle and relieves the tooth to that extent. By means of the contact spur the saddle can be adjusted at any time to close adaptation to the ridge.

I want to express my appreciation of your coming here, and repeat what I have said many times, that our aim should be the conservation of the natural remaining teeth and thereby conserve the health and lives of our patients.

ILLINOIS STATE DENTAL SOCIETY, FIFTY-FIRST
ANNUAL MEETING HELD AT PEORIA,
MAY 11, 12, 13, 14, 1915.

DISCUSSION ON THE PRESIDENT'S ADDRESS.

DR. C. N. JOHNSON, Chicago:

We have listened to a very masterly summing up of the present situation as it affects not only our own society but the profession at large, and I may say society at large. I am very proud of our president this morning.

He spoke of post-graduate study. There is nothing more important than that, and I deplore the fact that this movement has not been more successful in our state. Of course we cannot accomplish everything at once. This society has been busy, and the members have been busy, and we have done very well. It seems to me the next great movement should be along the lines of post-graduate work, and I believe that movement is well under way now, not in any one particular direction, probably not governed and guided as it should be by the state society, but there is a feeling in the profession that post-graduate work is necessary, and it is the most hopeful feeling we could have. Many post-graduate courses are being given. We do not commend all of the post-graduate courses, but they show a desire on the part of the pro-

fession to do work of that kind by studying after they have graduated. The recent graduate is not equipped to practice dentistry. Even if he were equipped today the developments of the profession would make him a back number in a few years, hence we must have this post-graduate work. The particular manner of having it done has not yet been worked out, but it will be in the near future. The remark has frequently been made that dentistry is the badge of a partial culture, a statement made by a medical man, and I confess I am human enough to be slightly irritated by it. I am impressed with the fact that we should conduct ourselves as members of the profession to make that kind of statement absolutely untenable. (Applause.) It is not a gracious thing for a medical man to make that statement because, as a matter of fact, the profession of dentistry today has greater requirements for graduation than the medical profession had at the time he made that statement. There is no question about that, and yet whenever that statement is made I have that peculiar feeling, and I hope that every man who is a dentist will take it to heart and start in on a course of reading and study and demeanor that will refute by example that assertion. (Applause.)

There was another phrase in that address that pleased me immensely, "That most careers are made or marred in the hours after supper." There is a volume in that one remark. Do you know, Mr. President, I often wonder what the members of the dental profession do with those hours after supper? You can not go to the theater every night. Most of you have not the price. You can not seek amusement every night, because amusement palls after a time. The most significant hours are those hours after supper, and there are more of those hours from supper to bed time than we ever dream of until we analyze them. We are accustomed to wasting those hours, and I believe they might be the most profitable hours we have. We do not want to continue the kind of work we have done in the day in those hours after supper, nor sit down at the desk and grind every night, but there is a wondrous possibility in those few hours if we systematize our efforts, and this we can do with great benefit and profit to ourselves.

Mention was made of emetin in the treatment of pyorrhea, and the hope was expressed that it was going to be practically a panacea. I am not going to discuss the virtue or otherwise of the

treatment by emetin. I would simply say this: To me the most deplorable feature of the whole situation is the fact that it has got into the public prints and a wrong impression has been carried to the people. It has developed a false hope on the part of the public as to the treatment of pyorrhea, and very many patients are going around with bottles in their pockets dabbing their gums with this stuff and are likely doing more harm than good. It is not getting at the treatment of this disease in the right way. I am not criticizing the men who have advocated this treatment. They were conscientious. Their claims did not begin to be anywhere near as exaggerated as the claims that have been made by other men since. When they said emetin seemed to do so and so, other men said emetin did so and so, in every case, and when the public press took it up and published it broadcast the people received the wrong impression, which is going to do much harm.

Dr. Barcus also spoke of the dental relief fund. I am not in a position to discuss that at this time because I must confess I am in some confusion as to what is the tangible method of taking care of our needy brothers. I take this occasion to pay a tribute to the committee of the National Dental Association for the energy they have put into this work, unselfishly, and with only the motive of doing the greatest good to the greatest number. That committee has not been given the credit to which it has been entitled for the immense labor done in this work. I believe some plan will be devised to bring about a fund of that kind.

In summing up, the president spoke of the future of this society. I made the statement a year ago in Chicago at the fiftieth anniversary, that I was somewhat anxious about the future of the society in one particular respect. There was an impression abroad at that time that this society had reached the acme of what a dental society could do, and I felt that was a dangerous position to take. Just as soon as any organization imagines that it is at the top, it has reached a dangerous point in its career, and from that point there is likely to be a retrograde movement. In the future our work must be more serious, more exacting, must be more faithful even than it has been in the past if we would keep the society going at the pace we have followed. This means hard work, and do you know, it is a dangerous thing to talk about hard work because so many men claim that the American people are working themselves

to death? I have had that doctrine pumped into me by many men. Some of them who labored the hardest to keep me from working so hard are unfortunately under the sod. Hard work does not kill.

I received a poem yesterday before leaving Chicago, from our good friend and non-resident member, Dr. Newkirk, of Pasadena, California, and I am going to read you that poem because I believe it hits the mark so far as my own sentiments are concerned better than anything I have ever listened to. The title of the poem is "Work." It was written by a woman, Angela Morgan, and I wish to say that I would travel half way across this continent to shake her hand. The poem is as follows:

WORK.

A SONG OF TRIUMPH.

Work!

Thank God for the might of it,
The ardor, the urge, the delight of it—
Work that springs from the heart's desire,
Setting the brain and the soul on fire—
Oh, what is so good as the heat of it,
And what is so glad at the beat of it,
And what is so kind as the stern command,
Challenging brain and heart and hand?

Work!

Thank God for the pride of it,
For the beautiful conquering tide of it,
Sweeping the life in its furious flood,
Thrilling the arteries, cleansing the blood.
Mastering stupor and dull despair,
Moving the dreamer to do and dare.
Oh, what is so good as the urge of it,
And what is so glad as the surge of it.
And what is so strong as the summons deep,
Rousing the torpid soul from sleep?

Work!

Thank God for the pace of it,
For the terrible, keen, swift race of it;

Fiery steeds in full control,
 Nostrils aquiver to greet the goal.
 Work, the power that drives behind,
 Guiding the purposes, taming the mind.
 Holding the runaway wishes back,
 Reining the will to one steady track—
 Triumphant over disaster.
 Oh, what is so good as the pain of it,
 And what is so great as the gain of it?
 And what is so kind as the cruel goad,
 Forcing us on through the rugged road?

Work!

Thank God for the swing of it,
 For the clamoring, hammering ring of it,
 Passion of labor daily hurled
 On the mighty anvils of the world.
 Oh, what is so fierce as the flame of it,
 And what is so huge as the aim of it?
 Thundering on through dearth and doubt,
 Calling the plan of the Maker out
 Work the Titan, work the friend,
 Shaping the earth to a glorious end,
 Draining the swamps, and blasting the hills,
 Doing whatever the spirit wills—
 Rending a continent apart,
 To answer the dream of the Master heart.
 Thank God for a world where none may shirk,
 Thank God for the splendor of work!

DR. HARRY F. LOTZ, Joliet:

Mr. President, ladies, and fellow members of the Illinois State Dental Society: Read the following story in *Everybody's Magazine* for last month:

"Cy Warman, author of the song, 'Sweet Marie,' who died a few months ago in Chicago, was a high official of the Grand Trunk Railroad; but he was always modest about his post.

"Once he stopped over night at a little hotel in northern Michigan, conducted by a man who had previously run a shooting gallery, and later a night lunch car in New York. The host related

his own life story at length. Then he became interested in the biography of the visitor.

" 'What do you do up in Montreal, Mr. Warman?'

" 'I work for the Grand Trunk,' said Mr. Warman.

" 'What kind of a job have you got—do you sell tickets or handle baggage?'

" 'Oh, I've got a better job than either of those,' said Cy. 'You know the man who goes alongside of the train and taps the wheels with a hammer to see that everything's all right? * * * Well, I help him listen.' "

That is what yours truly has been doing for years—sitting on the back seats listening, and now you have allowed me to come out here with a hammer and I am going to make the most of my opportunity.

Dr. Barcus kindly sent me a copy of his address May 1st, so it is not his fault that I am not better prepared.

Not all the advancements made during last year were staged in the east, but I am proud to hear our good president speak of the Forsythe Dental Infirmary in Boston. One of the very few good things in the *Dental World* which came out of the city of Boston. Knock one.

As we journey west let us stop a few moments in a city which our president loves, and view the dedicating ceremonies of the Evans Dental Institute in Philadelphia early in February of this year. Some of you may have missed this scene. A distinguished audience has assembled, some 2,000 people, to witness the conferring of honorary degrees upon a company of eminent surgeons. The degree of "Doctor of Science" is about to be bestowed upon members of this society whom we all love, Dr. G. V. Black and Dr. Truman W. Brophy. But let us leave this scene and journey to our beloved city of Chicago and view two advancements which were made this year. First, one of our large dental supply houses opened an educational department, offering free, five post-graduate courses of study. I just wish to speak of one phase of this instruction, that is the "Dental Economics" course. It is my hope that every dentist downstate can take this course in the near future.

The next advance to call your attention to is the "Evening Course" provided by one of our universities. Some 300 practitioners

are taking this graduate work in anesthesia. Some beautiful work is being shown and taught in infiltration and conductive anesthesia using novocain.

It is a grand opportunity for the general practitioner, and the evening courses of instruction are very popular. This carries us back to the "Post-Graduate Course of Study" undertaken by this society. Why was not this course successful? First, for the reason that we were newly reorganized members of component societies, and hadn't become accustomed to working together. I am speaking now of the component society of which I am a member—the Will-Grundy. There was such a mass of material prepared for us that we just couldn't get through it. We hadn't accumulated magazines and reference works, and what we had were not in shape for use. There was too much of the course. Today, if our State Society Bulletin should give us a little each month, I believe our members would carry on the work and enjoy it.

The literature exhibit is a good idea. Let us have an attractive display of books, old and new. Why shouldn't this society accumulate a dental library? We have a librarian and we have the money. Why not have a certain amount set aside each year for the purchase of our old and new dental books? Let us have a dental library like the one at Columbus, Ohio, and when I say this I am mindful of the dental libraries which have been accumulated in Chicago. We ought to have one downstate, say in Springfield. Our President speaks of the reading done by physicians—I have some thoughts as to why dentists do not read and study more, so many lack the proper equipment in their offices. Next to the proper light to operate by, is to have a proper light at one's desk, and this desk and comfortable desk chair should be in the operating room. Dentists who are tolerably busy know how much spare time they have. I am strong for crowding efficiency into business hours. Then why not spend in our offices, the hours in study which are not productive hours? Let us have the equipment at hand, so that we can use what spare time we have in study. I am just as strong for the average dentist to forget his calling out of business hours and devote his time to keeping abreast of the world.

Dr. Barcus speaks of the painless excavating of cavities. Is he speaking of desensitizing paste, analgesia, or infiltration and conductive anesthesia? All three are wonderful aids. I hope everyone

is working with novocain—for beautiful work is being done in this field.

The President has seen fit to mention the Educational Work carried on by this society through its Public Service Commission. Your committee this year has added a lecture outline course, with thirty-six slides on "The Care and Use of the Human Mouth" which is proving a great help and being appreciated by the public.

Wherever possible, our educational work should go hand in hand with other educational work in the community. For instance, we should help push Public Health Shows—make our educational work part of this big community work, also help organize Central Health Councils in every city, help spread the gospel of clean teeth, fresh air, safety first, etc. The Rotarians have a grand motto: "He Profits Most Who Serves Best." I wish that could be said of dentistry as we apply to the community problem. Dr. Barcus asks, are the aims of our State Society upwards and onwards? All thoughtful students will say yes. It is the thought of the thoughtful in this society, that the people in this state shall be better served than ever before. Yes, I am sure, yes, for we know dozens of men who are laboring for the betterment of this society in the hope of spreading their energy through us to the people, who, if they did not think so, would chuck all this added responsibility and spend their time and energy making dollars, which we all know they are perfectly capable of doing.

I am willing to help Dr. Crile, of Cleveland, do away with the surgical shock. Now that I have had my knock I am willing to throw away my hammer and buy a horn. I thank you.

DR. C. C. CORBETT:

I want to congratulate our President on his address. It is so full of good things that I think all the members of this society ought to read it when it appears in the DENTAL REVIEW next month, and then act on its advice.

Dr. Barcus has laid great stress on the importance of our society taking up a more thorough course in reading. This is good advice, and I believe the time is now ripe for those of our component societies which have not done so to take up this work. He also refers to a statement made by a physician some years ago, that "dentistry was the badge of a partial culture." There may have been some truth in this forty or fifty years ago, but today it is a

false statement. The dental profession now is as well educated as any other profession. This has been brought about by the high standard required for entrance into our colleges, and the curriculum there prescribed, making the standard for entrance into our profession as high as that of any of the other professions, and I believe in a short time it will be acknowledged as taking precedence in many particulars. Surely no calling can be more exacting than ours, and none demands such a varied list of requirements and qualifications; one cannot even be color-blind and be a successful practitioner. I want to commend our President for what he has given us, along the line of conservation. What has made it possible for Germany, with a population of thirty-eight millions in 1871 to advance to be the foremost nation of the world in 1914? Nothing but frugality, discipline and industry. They have no scrapheaps. When their young men have gone through several years of military training and discipline, then they realize that they are an integral part of their government and that they have a life to account for. There are no drones, and a life of frugality and industry follows; while we are a nation of pleasure seekers and spendthrifts, and if it were not for our great influx of immigration, and our vast resources, we would be far down the ladder from where we stand today.

It is work six days in a week, six days shalt thou labor is the commandment, and it requires application and frugality and industry to build up a nation to its maximum of possibilities, and the same applies to individual members of a profession like ours.

Our President has surely given us something worth thinking about, something worth following. "Dost thou love life?" Then do not squander time, for that is the stuff life is made of. Just think of it, surely that saying cuts deep. Let us cut out the scrap heaps and waste, that have caused so many failures. And how can this be done? By system, by the regulation of our lives, no other way. A regulation that will give us a proper amount of time for rest and sleep, for reading and recreation, and for our practice, and then make an effort to accomplish all that is possible in each period of that time. The degree of success one attains depends considerably on the natural qualifications one possesses to meet the varied requirements. I hope some day that our government will take up the work of vocational training, and assist

our boys and girls in selecting the right calling to which they are especially adapted. If the boy is to become efficient he must comprehend his work in all its relations to science, to art and to society in general. "The young man who understands his profession in its scientific relations, its historical, economic and social bearings, will take a higher view of his calling, of his powers and duties as a citizen and as a member of society."

I remember three years ago that I advocated a relief fund, the income of which could be used for the relief of unfortunate members who had met with reverses and had seen their savings swept away through no fault of theirs. I have in mind two of our most beloved members, father and son, both sick at that time, and making every effort to regain their health. About one year later the father was called across the great divide. I saw the son in February, 1914, when he told me that he was living on borrowed money. A few months later he, too, was called to join his father. His wife and child being left to battle with the world and pay back the money which had been borrowed. I still stand for the establishment of a relief fund, and advocate the increase of the dues at least fifty cents per annum for that purpose.

I believe it will be more satisfactory if our State Society develops its own relief fund, and disburses its own beneficence.

DR. DONALD M. GALLIE, Chicago:

Mr. President and Members of the Illinois State Dental Society: I did not contemplate taking part in the discussion of the President's address, and it is only his reference to the Forsyth Dental Infirmary for Children that has prompted me to say something on that subject.

The dedication of that great institute certainly marked an epoch in the history of dentistry. I do not think anything up-to-date, unless it is the starting of dental colleges and the publishing of dental literature, was of as much importance to the profession and to humanity as the dedication of the Forsyth Institute, not only on account of the great benefit to humanity and to dentistry, but because it recognizes the fact that dentistry plays such an important part in the life and comfort and health of the children of the nation. Most of you, I suppose all of you, have read a great deal about that institution, as much has been published regarding it,

yet I will go rather hurriedly over some of the features that may not be familiar to you.

One of the Forsythe brothers had an idea that he would like to leave his money, as he had no children, to some worthy charity, and one morning while he was in the dental office of Dr. Irving Johnson, he made the remark that he would like to find some means of leaving his money to some charity, and he asked Dr. Johnson for suggestions. Dr. Johnson said there was need of an infirmary or institute in which the children of the City of Boston could have their teeth cared for. Mr. Forsyth said he would give the idea some thought, and in a day or two made a will leaving a fortune of \$500,000.00 for the purpose of starting a dental infirmary. He was called out of town on business, was taken ill, and died before he had signed his will. His three surviving brothers were named as executors of the estate, and when they read the will which was not signed, leaving this money for the establishment of a dental infirmary, and the remaining three brothers being heirs of his estate, they decided to carry out the wishes of their brother, and not only that, they decided to make the Forsyth Memorial a monument to the Forsyths of Boston, with the result that the fortune of the Forsyth brothers was left to this Institute.

Only one of the surviving members of the family of Forsyths was present at the dedication. The carrying out of this splendid thought has resulted in one of the most beautiful institutions in the City of Boston. They secured a tract of land in the Fenway next to the park and have erected a building that is equal to anything in the country. It is of white marble from the ground to the great tile roof. It is marble inside and out. It is one of the choicest locations in the City of Boston. Next to the triangular block there were located apartment buildings, and an effort was made to buy these apartment buildings and the ground, and the owner, who was an ex-governor of the State of Massachusetts, asked a prohibitive price for it. The Mayor and the City Council condemned the property and turned it over to the City for park purposes, which is now a part of the beautiful system of the Fenway, and Mr. Forsyth the night before action was taken by the Council of the City of Boston was appointed chairman of one of the greatest charity bodies in that city. This building, therefore, stands as a monument to the Forsyths and is the greatest contribution dentistry has received.

Both the interior and outside are beautiful, and it is in every sense a most complete institution. Ex-President Eliot said to me, "Dr. Gallie, I have been all over the world many times; I have been interested in everything that pertains to educational life; I have visited the great hospitals of this country and of other countries, and I must say, there is nothing I have ever seen which equals in thoroughness and completeness of detail the Forsyth Dental Infirmary."

As you enter from the beautiful sunken gardens you will see the entrance for children, and the hallway leading to the waiting room would seem to be the last word in beauty and interest for children. There are nursery rhymes on the walls; there is a great fireplace at one end, and in the center of the waiting room there is a large natatorium in which there are all specimens of sea life known in the Atlantic. There is everything to interest the children. As you go up the great marble stairway you will see a sterilizing room which seems to be the last word in protection against transmitting disease. This sterilizing room is fitted up with the latest devices. There is a wagon that goes and collects the trays of instruments from the operators after they have been used, and brings them to the sterilizing room. There is a duplicate set of instruments carried to each chair. The great marble stairway leads to the infirmary. There is provision for one hundred and ten chairs, sixty-five of which are there. There is every convenience. There is not a cup in the whole infirmary. Every precaution is taken against the transmission of disease. All chairs have a bubbling fountain. The hands need not touch anything. The arrangement is such that if you want hot water you press your knee in one direction, and if you want cold water you press it in another direction. Everything is so arranged that there is the least possible chance for contamination.

The orthodontia department and the different laboratories are so completely equipped that, it seems to me, there is no chance for improvement.

The laboratories down stairs for research work are complete, so that every provision is made to care for the children and to encourage research and study on the part of dentists.

As you doubtless know, this institute cost \$1,900,000 to build and equip, and it is endowed for \$2,000,000. It has a wonderful future.

At the dedicatory exercises I represented the National Association, and to me it was the event of my life. The exercises were held in the great infirmary. There were 1,800 people present, and some of the best in Boston were out on that occasion. The Governor of the state was there, the Mayor of the City of Boston, ex-President Eliot of Harvard and President Lowell, the president of Tuft's College, Dr. Rosenau, the great medical authority, and the head of the great tuberculosis institute at Harvard, the commissioner of health, the prelate of the Catholic church, and the bishops of the Methodist and Episcopal churches. The exercises were carried out perfectly, and it certainly was to me a great and grand event because it showed to me at least that our profession was recognized in a way that it deserved. That event not only marked a great charitable innovation, but also the great recognition of dentistry.

A movement is now on foot by some dentists in the East, in order to show their appreciation of Mr. Forsyth for the interest he has taken in dentistry and the great work he has done in making possible this infirmary, to present him with some testimonial in the way of a loving cup or something of that kind.

As president of the National Dental Association I have been in correspondence with these men, and I have consulted with the members of the Board of Trustees of the National Dental Association, and it is suggested by the different state societies that a contribution of twenty-five cents by each member of the profession would make a testimonial in keeping with the great work Mr. Forsyth has done.

I was very much interested in that part of the President's address that referred to a relief fund. That is a question which is giving the National Dental Association more concern than any other question before it. We have consulted and have been advised by some of the leading insurance men that we cannot carry out this work in the National Dental Association successfully; that it is going to be such a tremendous thing as to require treatment by itself, and we have so much work that it will be practically impossible to carry it out successfully. Dr. Gaylord was president at Ann Arbor at the meeting of the Pedagogic Society and the question was discussed there, but we were unable to come to any solution of that important problem.

Dr. Corbett has indicated the best solution by each state hand-

ling its own affairs. There is no question but that something must be done along this line. Dentists have not been liberal contributors. We have not been liberal contributors to anything. We must take care of our unfortunates and those who are not successful and have not been able to lay aside something for the proverbial "rainy day."

We will have with us tomorrow, Dr. Price, Chairman of the Research Commission of the National Dental Association, who will present the work of that body, and who will ask the Illinois State Dental Society to come up and stand with other states and take the position that this state should. Of all the states in the union we are the poorest contributors to the National Research Fund, and we hope at this meeting Illinois will be placed where she belongs as a contributor to this great work of the National Association.

There are instances where we must consider the unfortunate. I am familiar with the pathetic picture of the man described by Dr. Corbett who has worked for this society for fifty years, and it is such instances that really prompt us to be generous. As I have said, we have not been liberal contributors. We have not been great buyers of books, and the time has come, considering the great importance attached to dentistry, for us to show we are willing to contribute, that we are willing to aid in the great work undertaken at this time, to make dentistry better not only for the sake of humanity, but better as a profession. (Applause.)

DR. JOHN P. BUCKLEY, CHICAGO:

I am glad Dr. Gallie referred to that part of the president's address relating to a national relief fund because as the President of the National Dental Association has said, this is a most serious problem for the Board of Trustees. Dr. Gaylord, who has been working along this line, is now beginning, for the first time, to appreciate its magnitude, and he is at a loss to know what to do.

In regard to the Forsyth Dental Infirmary for Children, permit your temporary Chairman to say one word. Dr. Gallie spoke of that great institution at the time it was dedicated. I followed in a few weeks' time when it was in operation, and I want to add this, that the one thing that impressed me deeply more than anything else was the smile on the children's faces. They smiled as

they waited to go into the chair, they smiled while in the chair, and they smiled as they left the reception room.

Among the other things that impressed me very favorably was the flash-light system. Instead of having to ring a bell, by means of a flashlight it was made known at what chair a tray of instruments was wanted.

We have an ex-president of this society who has been asked to discuss a particular portion of the president's address, relating to the post-graduate course of study. I will call upon Dr. Arthur D. Black to continue the discussion.

DR. ARTHUR D. BLACK, CHICAGO:

I am only going to occupy a few minutes and will confine what I shall have to say to the proposition of post-graduate study. In doing so I wish to express my appreciation of our president's address and my particular interest in this phase of it.

I have watched carefully the development of post-graduate study in the dental profession from almost every angle, and I question whether or not much of the work which has been done has been on the basis or on the plan which will eventually lead to the best results. We need in the dental profession, as we all recognize, the development of the habit of study by the individual members of the profession, and it seems to me that thought should be the basis of every movement, of every plan, for the development of the dental profession. We are today facing the greatest opportunity which has ever come to us to make ourselves a real integral part of medicine, which means that we must know more of the basic propositions upon which medicine is founded; that our schools must teach more of these things and teach them better than they have done heretofore, but the change in the curriculum of the dental college is not going to make the dental profession a studious group of men. The fact that the dental school of today has an entrance requirement or curriculum that is better than the medical school fifty or twenty years ago does not make the individual member of the dental profession a student and it never will. The post-graduate course of study as it is conducted by most societies today will not do this, because that study course has come to consist in most societies of the invitation of some man who has a reputation in a particular line to come and talk to that society for five or six hours during the meeting. That does not make the

individual member of the profession a student. All the propositions for education of the dental profession seem to be based on the idea of pouring information in by somebody. The rank and file of the profession is willing to listen but not to study. I have only this suggestion to make, that in the development of post-graduate study we should bear this central thought in mind, that development should be along lines which will tend to interest the largest number of men to do more and a great deal more, all leading to individual work. That is not an attractive position for any committee to undertake because the dental profession has not been in the habit of studying much. No matter what its excuse is, that is a fact, and to endeavor to interest a large number of men to do individual work is not an attractive position for any committee or for a society itself to undertake because progress must be so slow. I do not mean to condemn the advancement we have made. Possibly it is all we should expect, but I do believe that we should keep in mind in considering the post-graduate course of study the idea that this should be directed towards interesting more and more of our members to do individual work, and not to develop plans along lines which will tend to make men listeners rather than workers in matters of study.

As a profession, we are invited to co-operate with the medical profession in seeking foci of infection. There is presented to the medical profession today somewhat this situation as I see it: They have come to recognize a considerable group of diseases which are known to come generally as secondary effects of infected foci. These may be anywhere in the body. The statements of such men as Hunter of London, and Billings of Chicago, and many other men who have been prominent in these studies, show that the majority of these foci are in the mouth. Medical men, when these cases present themselves, are referring patients to the various specialists to find these foci. If the investigations of Billings and the other men are true, most of these foci ought to be found in the mouth. They are there, I believe. In what position are we as a profession to meet this demand from the medical profession and from the public and to do our part both in preventing and in curing this group of diseases? To do this we need some basic education. We certainly need some knowledge of the relationship of general physical conditions to these foci. We need to know more of all these basic propositions of pathology, physiology and bacteriology than we do.

The only way I know of we can get this is by going to the literature of dentistry and medicine and digging it out, and most of us will not get it otherwise. If the dental profession knew as much as it ought to know of diseases of the peridental membrane, the present situation with reference to emetin would not exist, because we would have known enough to have met the medical profession when their members advocated the use of it and to have shown them why this treatment could not be successful, and would have known enough to meet the public and have told them why this treatment cannot be successful, admitting the helpful things there are in it.

I wish only to make this plea in line with the president's address. We ought to develop in this society the central idea, slow as it may be and discouraging as it may be in many ways, which will tend to make every man study a little, to read a little more than he does today, to develop here and there over the state men who will become interested in the study of problems, and who will as a result of that study gradually bring the members of our profession more nearly in line with the other leading professions.

It seems to me the most serious problem which confronts our dental research committee today, is to get men to study and work out the problems which need to be worked out, and we are not going to have such men until the time comes when a large number of the members of the dental profession will be inclined to study more.

We are inclined to blame the schools for all the troubles that come to the dental profession. In this connection I would make the statement that men who are connected with dental schools appreciate the situation as gladly as any group of men could. I believe as a body they are laying plans to improve the method of teaching, so that the men who go out from the schools will be better equipped. In that connection I would make this suggestion to the members of the society, that each difficulty which presents to the dental school in educating men in a better way may be blamed on the rank and file of the dental profession because of the fact that we as members of the profession send too many students to a dental school having put into their minds the idea that they do not have to study much. If all members of the dental profession could be induced to inform young men that dentistry is a calling which requires study,

and very much study, when they present themselves to a dental school they will go there with the idea that they have something else to do besides technical things, and it will improve the methods and turn out men who are inclined to study. (Applause.)

DR. W. H. G. LOGAN, Chicago:

Dr. Lotz said he thought it was appropriate that a dentist should have dental books in his office and dental journals, and the time that presented between patients should be occupied in study. Personally, that is one thing I have tried to avoid. I will tell you why. I believe that your office should not be a place for study. I believe your office should be for the conducting of your practice and a certain definite time set aside for study between supper time and bed time. If you will follow that, you will not be in the midst of some article when a patient comes in and feel rather disinclined to see that patient immediately and give him or her the attention he demands or needs. No. Make of your office a place for conducting the practice of dentistry; make of your home a place to study nights. Select some room in your home where you can sit at a desk or on some chair and study. Do not study every night, but make it a practice of studying so many hours a week. In a chair and by a good light you can do a good deal of studying, and then when the time comes to gather the fruit of your study and to lay plans for some other things, you can step into your study room, close the door and the members of the family will know that the door is not to be opened; that you are to be let alone, whether it is eleven o'clock or one o'clock. They have learned to know that you are in the midst of something and that you must not be disturbed when the mood tells you you can work. At other times it is better to go to the theater and have a fine time.

As I sat and listened to the president's address and to the gentlemen who discussed it, I said to myself it is no wonder they are men who have been able to do things. They have accomplished things because they have given out great ideas, great enthusiasm, and all of us will go home and do better work than we have been doing as the result of listening to this address and to the discussions on it. I thank you. (Applause.)

DR. THOMAS L. GILMER, Chicago:

The address of our president is timely and most excellent, but it is just exactly what we would naturally expect to come from

this man. At least, I would expect it from him because I have known him for a long time. He is a thoughtful, serious, progressive, professional man. We have to go to the country sometimes to get the best things, and there are a lot of men scattered over the state of Illinois who could give us most excellent papers, who are thoughtful men.

We are making wonderful progress all the time, but there is one thing I feel that we should give some attention to along with the progress that we are seemingly making. I have noticed in the last few years a great tendency among certain dentists or certain professional men to commercialize too much. I may be wrong in that. I may be pessimistic, but I wish that this might not be true. For instance, the type was hardly cold regarding the treatment of pyorrhea by emetin until the whole country was flooded with literature on the subject which gave hopes that were based on very flimsy foundations.

Then we have post-graduate study which I think is questionable. I believe it is questionable for a supply house to have post-graduate courses. It may be that good comes from it, but there is a smack of commercialism in it.

As to systematic study, we have got to form the habit of study and as Dr. Black has said we cannot go and have knowledge poured into us, but we must do it ourselves. We may take an animal and fill its stomach full with rich food all at once, but it will not stay there. If an individual, for instance, improves physically as a result of what he takes in, he must have some labor connected with it. I once heard a very brilliant man, a member of this society, who has now passed away, say that he had gotten all out of dentistry that there was in it. He felt he had reached the top, and there was no top higher than that he had reached. There is no such thing as the top of any profession. We cannot reach it. We must climb and climb, and as we do so new facts will unfold. Some one said to Edison, "I suppose you have gotten all out of electricity there is in it." He remarked, "No, you may have an eighty acre field, and there may be a small knot hole in your fence; you peep through the knot hole and you see something, and I have gotten just about as much out of electricity as I could if I had looked into this wonderfully big field only through a small knot hole." That is the way with us. We are peeping through a

knot hole. There is no limit to which we can go, and this not only pertains to dentistry but to other professions. It is so in everything. The world intended that it should be that way. (Applause.)

DR. J. M. BARCUS, Carlinville (closing):

I will only thank the gentlemen who have so generously discussed my address and for amplifying it and for perfecting it. I think there is a time to stop, and I will avail myself of that thought now.

DINNER TO DR. NEWELL SILL JENKINS.

As announced in the June issue of the DENTAL REVIEW a complimentary dinner was tendered Dr. Jenkins on May 15th, 1915, at the Hotel Taft, New Haven, Conn. It was an unusual outpouring of good fellowship and welcome, and a fitting reception to one of the most distinguished men in dentistry. Dr. Jenkins, after a residence abroad of half a century, has returned to America—his native land, and it was very appropriate that his friends in the profession should manifest in this delightful way their great pleasure in having him with them again. The attendance was good, and there were more than one hundred telegrams and letters sent by those who could not be present. The occasion was a success in every way, and reflected credit upon the New Haven dentists who conducted it.

The toastmaster was none other than the ever-delightful Dr. Edwin T. Darby, of Philadelphia, and the following speakers entertained the audience, each paying his tribute to the distinguished guest: President Arthur Twining Hadley, of Yale; Dr. Truman W. Brophy, Dr. James McManus, Dr. Edward C. Kirk, Dr. R. Ottolengui and Dr. C. N. Johnson. Drs. Bryant and Gaylord of the New Haven Dental Society appropriately welcomed Dr. Jenkins and the assembly, and made every one feel at home. But the crowning features of the event were the presence in the balcony of the lady guests, chief among whom was Mrs. Jenkins; and the masterly address made by the guest of the evening. Dr. Jenkins never appeared to better advantage than he did on this occasion, and his address was in every way worthy of the man. It gives us pleasure to herewith reproduce it:

ADDRESS BY DR. JENKINS.

In rising to return thanks for the generous kindness, sympathy and affection with which you, my friends, have welcomed me to my dear, native land, where man is man and master of his fate, there are two subjects upon which I beg permission to briefly give you some of the results of my long European experience and observation.

The first relates to the influence of our profession upon Europe; the second to the influence of American institutions and character upon Europe.

I trust you will pardon me for using chiefly the written word, for these are times when the appeal to emotion is so strong that only a trained orator may venture to use unguarded speech.

The experience I have had of European life and practice has been but a continuation of that of the able group of men who preceded me and who already had made the reputation of American dentistry abroad. Men like Brewster, Evans, Abbot and Coffin were the true pioneers. All of us who came after them reaped the advantage they had gained by reason of their rare professional and personal accomplishments. They were men who would have adorned any profession and who would have attained distinction in any community. All of them were Americans of the original stock, and as my honored friend and colleague, Dr. Spring, the President of the American Dental Society of Europe, can tell you, the names of a great majority of the American born members of that society hark back, even today, to colonial times. Here we have an interesting example of hereditary transmission. Our Puritan ancestors having left behind them the only civilization that they knew, undertook the stupendous task of fitting this vast continent to the uses of the noblest purpose ever conceived by the mind of man. In this work they developed a resourcefulness and ingenuity and an independence of mind, which has not only been a prime factor in developing American Dentistry, but has been the parent of those wonderful discoveries and inventions with which America has astonished and blessed and transformed the world.

But the true origin of American Dentistry was not simply in the great ingenuity of its early practitioners, but also in the labors of those enlightened men who, three-quarters of a century

ago, determined that dentistry should no longer be regarded simply as a mechanical art and who elevated it to its rightful place as a department of medicine. In this movement, which established the first College of Dental Surgery at Baltimore, the nations of all the earth have been blessed.

For, even as in that revival of letters, which we call the Renaissance, students of the northern peoples trudged through the passes of the icy Alps to share and carry back to their homes something of the new learning, so, from the foundation of the first dental school pilgrims came from Europe to America in ever increasing numbers to study this new branch of healing.

For generations American medicine has benefited by European learning and instruction. Originally American medical students went to England, and later to France, and later still to Germany and Austria for post-graduate courses. In all these countries they were most generously received and America incurred a great debt of gratitude to Europe, despite the many returns which she made through her own medical achievements. But there is one way through which that great obligation to Europe has been fully met. The most conspicuous and characteristic contribution America has made to medicine has been in what we proudly call today—American Dentistry. It is true that American dentists, practicing abroad, have done much for European enlightenment, their beneficent activity reaching its climax in the phenomenal career of the gifted and beloved Miller; but it has been the united labor of eminent instructors and practitioners here at home which has made the work complete.

At last every great European country recognizes and teaches Dentistry as an honored and indispensable branch of medicine. Public dental hygiene has been widely taught and practiced, and, up to nine months ago, a new generation was being brought up in many parts of Europe in a state of oral sanitation such as had hitherto been unknown. But even in the stress of the most awful catastrophe which has ever befallen the human race, Dentistry continues its humane work.

Many thousands of soldiers have been prevented from adding to the other miseries of war the disablement which comes from dental maladies, and in that abundant class of wounds of the jaws and face it has been Dentistry which has shown the

way to work rapid repair, to restore lost function, and to avoid disfigurement. In these and in other ways, therefore, American Dentistry has influenced Europe.

The influence of American institutions and character upon Europe begins with a vision of sharp contrasts. When our forefathers founded our government, they made a complete break with European traditions. Here are no monarchies, no hereditary aristocracy, no law of primogeniture, no national church, no fettered press, no peasants bound to the soil, no jealousy of neighbors, no vast armies, no schemes of conquest by force. For here is the one great home of civil and religious liberty, and equal rights before the law.

We have also frankly shared our splendid patrimony with all the peoples of Europe. This was done in the firm belief that the influence of free institutions would cause them to be so completely assimilated that all the feuds and passions, jealousies, fanaticisms and prejudices, born of ignorance or misgovernment under unnatural social conditions, should finally fade away.

One result of this generous policy has been to cause the institutions of distant America to become better known among great numbers of the common people of Europe than are those of their near neighbors of an alien race.

It was a distinction to be an American when I first went abroad in 1866. Our country had issued triumphantly from the Civil War and was relieved forever from the stigma of slavery, and had begun those plans for the development of our vast resources which excited the wonder and admiration of the world. Especially American dentists were welcome, and when I arrived in Dresden with letters to the medical authorities, they received me gladly and made the ways easy for me. At that time Dresden was full of diplomats and other distinguished personages from many parts of Europe, since Dresden was traditionally a convenient post of observation, and the North German Bund was then being formed. As many of these personages came to me, I shortly had an international practice, which caused me to take a wide interest in European politics.

To have known, as perhaps only an American aloof from prejudice and personal interest could have known, some of the actors in public affairs gave me a certain understanding of cur-

rent events, and it is therefore that I venture to offer you some of my impressions. And here I beg to say that I have never seen any European society in which Americans, who were frankly loyal to American principles, and yet able to appreciate the complications of European conditions, have not been respected, and I have never known an intelligent European who was not only willing, but anxious, to know the American attitude towards any European question.

Permit me then to mention some of the events which I have felt indicated the influence of America upon Europe.

Roman Catholic Austria-Hungary, driven out of Germany, received a liberal constitution from the hands of a Protestant Prime Minister, and in this constitution American liberty of the press was insisted upon.

Imperial Germany adopted a constitution in which the Bundesrath bore a resemblance to the American Senate.

A French Republic, adopted because it was a form of government which in time of national humiliation divided Frenchmen the least, has become the Government which has united France the most completely and has given her in these times of deadly peril a national army, more devoted and more efficient than any ever known in all her previous history.

Russia, admonished by the American conflict, emancipated her serfs by Imperial Decree and profiting by the thwarting of her ambitions in the East, established the beginning of parliamentary government in the Duma.

That classic land, known in my youth only as a geographical expression, has bloomed into a united, monarchical, and yet democratic Italy.

Bulgaria, under a statesman who, like many of his most influential compatriots, had received an American education, drove the unspeakable Turk out of his misruled European provinces.

England, after a century of struggle, has put an end to the obstruction of the House of Lords, and done justice to Ireland.

America, to the astonishment, and we hope to the instruction of all Europe, kept her plighted word in setting Cuba free.

These are among the consolations which we may take to our troubled souls in this time of unprecedented tragedy.

In Europe, the old order is perishing. Out of this awful welter of passion and misery may come either a barren victory or mutual exhaustion. But whatever may be the outcome, one thing stands sure—some way must be devised to teach the broken nations to live in harmony with each other. May it be given to our dear America, out of her own experience, and through her patience, compassion and self-control, to show to distracted Europe the way to find enduring peace.

* * *

After the speech of President Hadley and the presentation of the diploma of Honorary Membership in the New Haven Dental Society by Dr. Ottolengui, Dr. Jenkins again rose and said:

My dear friends, I have no words suitable to express my thanks for the honor you have conferred and the splendid welcome home which you have given me.

President Hadley has spoken of my friendship with Wagner, one of the most precious reminiscences of my long life. You will remember that Richard Wagner was a democrat and a refugee of '48. One day he brought me a copy of the Fest March which he had written for the American Centennial. He told me how he had reflected long upon what America was and what she meant to the world, and when at last he was full of the spirit of the occasion he composed this noble march and gave to it a motto from Goethe, which may be interpreted as, "He alone deserves Liberty who is ready every day to die for her." I told him Americans would add, "He alone deserves Liberty who is ready every day to live for her."

It is in this spirit, my friends, that I return to you. I pledge myself, like you, to give daily service to our dear native land, to live for her in clear thought, with high purpose and a pure heart, and never to despair of the fulfillment of her great and beneficent destiny.

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EDITORIAL.

THE INFLUENCE OF THE TEACHER.

In a recent address before a graduating class of dental students the Rev. Dr. Covert of Chicago emphasized the fact that the best things a student learned from a teacher related not so much to the technical knowledge imparted in the course of lectures as it did to the projection of the personality of the teacher into the consciousness of the student, and the example set by the former to the latter. This fact has impressed itself more and more upon the writer in his capacity as a teacher during the past twenty-five years, and he has frequently urged upon professors in colleges a recognition of the fact that the duty of the teacher went much farther than the mere imparting of a given amount of technical knowledge. Too frequently the professor forgets how closely the student studies his personality and how greatly he is influenced by it. There is no walk in life carrying with it a more serious responsibility than that of a teacher of young men in a professional school. For weal or woe the student follows every act of his teacher as a guide to his own conduct in life, and in most instances not even the student himself is conscious of the extent to which he is being molded in character and attainment by his association with the teacher. The student is usually in his formative period and is easily led. If he is led in the right direction he will be a credit to his teacher—if in the wrong direction he will be a reflection upon him. Not that all students who come to college may be made good by

good example or bad by bad example. The environment outside the college doors counts for much, and the early antecedents of the student must be taken into account; and yet after all there is no one single factor which is so potent an influence during those particular years of college life as the example set by the personality of the teacher. This does not so much relate to any moralizing on the part of the teacher as it does to the daily and hourly example he sets before the class.

The technical things taught to the student in college may or may not be remembered after graduation, but so long as life lasts the personal attributes of the teacher stand out as the prominent memory of college days. If all teachers will remember this it will surely result in an exalted conception of their responsibility, and a more serious consecration to the work in hand.

THE EDITOR'S DESK.

ABROAD IN WAR TIMES.

ANOTHER VACATION STORY.

(Concluded from the June Issue.)

HOMEWARD BOUND.

The morning of the sailing of the Royal George came, and we had received no word at our hotel of her passage being canceled, so we were soon in the bustle of preparation. We had been warned to be at the Paddington Station at least an hour before train time. I asked the porter at the hotel to order a bus to take my family and our luggage to the station. "How many are there?" he asked. "Four people, five trunks and four grips," I said. "Well, sir, I am really afraid you will have to have a four wheeler." I acknowledged the soft impeachment, and wondered if he had expected to put us all in a hansom cab and pile the luggage on top. I told him to order a large enough vehicle. Be it remembered that in London you order a bus and go wherever

you wish, with your family inside and your luggage on top—which is really a very good arrangement. I asked the porter what the fare would be. "Well, sir, I should say that for so many with luggage it would be about three and six." Which being interpreted means about eighty-five cents. I thought the station must be next door, but I learned differently. In a few minutes up drove a one-horse cab with four tiny seats inside and a flat top. An old chap past military age sat on the box. I thought the porter must have made a mistake but no—the cab had four wheels. How they were going to pile five trunks on top of that rig I could not imagine, but they did, and then tied them on. We climbed gingerly into the cab and the cavalcade started out. It was worse than a ship at sea, and the rig swayed back and forth terrifically. The horse chugged-chugged along block after block, and we were all in an agony of suspense every moment. At each turn the old ship listed awfully to port, and we scrambled to starboard to keep it from going over. It was the most top-heavy craft I ever rode in and the distance became interminable. But we got there at last and all heaved a sigh simultaneously. When I asked the cabby what the charge was he said six shillings. "But," said I, "the porter told me it would be only three and six." And that was by all odds the meanest thing I said in London. "Well," said he, "make it five." I paid him gladly. It was cheap. His rig will never be the same again.

There was the usual confusion at the station. It seemed as if every one was going on the Royal George, and no one was permitted to get on the train who could not show a boat ticket. I must at this point acknowledge a small piece of bribery. It was shameful, but I did it—and I am brazen enough to say that I would do it again, under the same circumstances. I had my family with me and must look after their comfort. Two porters were attending to my luggage and had it on a truck by the track. A guard came along and I engaged him in conversation by remarking favorably on the quality of the British arms. He warmed up and told me that he was going down on the Bristol train. As he stepped away a moment I asked a friend if it would be safe to offer a tip to a guard, intimating that one of our regular conductors at home would be offended.

"Safe to offer a tip!" he exclaimed. "Man, remember you are in Europe!"

When the guard came around again I slipped a two shilling piece in his hand and he instantly turned to the porters and said: "See that this gentleman's luggage is put on the train the minute it backs in and that he and his family have a compartment to themselves."

And it was done. Even in the rush and clamor of getting all those people located on the train he took the trouble to come back to our compartment and assure us that our trunks were safely aboard. We received so much attention that in one way I felt guilty, but in another way I felt comfortable and secure.

Avonmouth, from which port the Royal George sailed, is about seven miles from Bristol and as the train pulled up to the dock we were made more than ordinarily conscious of the reality of war. Lined up beside the track nearly as far as we could see were hundreds and hundreds of automobiles and delivery trucks that had been pressed into service by the military, while soldiers were scattered all over the yard. They were a fine looking lot of young fellows with none of the degeneracy about them of the London slums, and it seemed a crime against civilization to have them shot down. But they were the cheeriest lot of chaps I ever saw, and before the boat sailed they clambered up on the freight shed beside the dock, and entertained us with songs. They cheered the passengers on the Royal George, and exchanged the most cordial greetings. Finally one lusty young chap sang out: "Three cheers for the Stars and Stripes!" And it was given with a will. There were many Americans on board, and that gracious little act sent a thrill through every American heart. The passengers yelled back: "Good luck, boys." And it was answered with a whoop. Finally the soldier boys began cutting off the metal ornaments from their uniforms and tossing them to the young ladies on the ship and it was not long till the metal shower over the deck had depleted the decoration of many a soldier boy. It was the most splendid demonstration in a small way that I have ever seen, and as the ship moved slowly out they doffed their hats and in the most gentlemanly and courteous manner said: "Good by all—and a safe voyage." We

responded with a hearty, "Good by, boys, and once more good luck."

Not one word had been uttered in a disrespectful way of any one—not a single reference to the enemy. It was splendid.

We moved slowly out into the dark of the harbor and the boys faded from view. We shall probably never see any of them again. We shall not even know their fate, but that little touch of humanity which they gave us that night will never be forgotten by any of those who witnessed it.

The Royal George was crowded to her capacity, but everything was done for our comfort, and we had a good passage. This is not to say that it was devoid of excitement. In fact we had plenty of it, and some that was very disquieting. We of course had to run with darkened decks at night and every window and port hole closed against the light, which seemed at best a pokey piece of business. We were obliged to take a far northerly course and were headed for the straits of Belle Isle, up by Labrador. It therefore grew very cold and there was some suffering on this account. Then the second day out it was quite rough, and there were more seasick people than I ever saw. The ship of course had almost no freight and she tossed plentifully. But there are always amusing incidents on board and I am mean enough to recite one. I was sitting in a steamer chair on the promenade deck watching the white caps and enjoying it, when I saw a few feet away a young fellow who didn't look happy. He lay back in his chair with a faraway expression on his face and a pre-occupied air as if he were struggling with some mighty problem. Evidently he failed to hear a word that his companion was saying to him. His countenance grew graver and graver, till finally he arose and in a most ludicrous attempt at dignity, he strode to the edge of the deck. He surreptitiously leaned over the rail and gazed out to sea as if he would have everybody believe that nothing was the matter. Suddenly he leaned over a trifle further, raised his hand to the side of his face and heaved a most prodigious heave. It was all done so quietly, so unostentatiously, and with such profound reserve and dignity that it excited my admiration. It was really the most artistic piece of work I ever witnessed. But this did not prevent me from smiling a most ungenerous smile, and remarking to myself

that there were situations into which the most exalted dignity did not fit.

Many incidents of the passage might be mentioned to show the tension under which the passengers were laboring, and yet on the whole they behaved with splendid spirit and seemed resolved to make the best of everything.

Some very excellent people were coming steerage, and at night it was pathetic to see them carry their blankets and pillows up to the library and music room and sleep on the lounges and floors, rather than tolerate their cabins below.

But the most annoying and disturbing features of the passage were the fogs and the icebergs. The fog whistle blew too often to please us, and the ship sailed under reduced speed thirteen hours and fifty-five minutes of the voyage. The icebergs were very beautiful to look at, but some of them came too close for comfort. One night we had a serious fright. It was about midnight and we had been having a concert that night—the proceeds, made up of a collection, to go to the aid of the Seaman's Charities. Many people were still up chatting about the success of the concert, and all were feeling better than at any time during the trip, when suddenly the propellers began to reverse and the ship shuddered as if riven from stem to stern. It was terrifying for a moment, the longest moment I ever experienced. If there had been any large number of people congregated at one point it would have resulted in a panic, and as it was many of the ladies became hysterical. Those in their cabins rushed to the windows to see what the trouble was, and the ones on the starboard side saw looming up in the darkness an immense iceberg which we had barely missed. It was too tight a fit to be pleasant. Fortunately the ship was slowed down or there might have been headlines in the papers next morning on shore. The passengers behaved remarkably well considering the nervous tension under which most of them had been living for the previous few weeks.

But it is never difficult to start a panic on board a ship, as is well illustrated by an experience of Dr. Brophy of Chicago when on a previous trip to America on the Royal Edward—the sister ship to the Royal George. One night he was walking along the passage way to his stateroom when a woman rushed

out of her cabin screaming and shouting that they were all going to the bottom. He tried to stop her lest she should alarm the whole ship. "Nothing is wrong, madam; go back to your cabin. The ship is all right." But she persisted that the boat was going down, and it took some moments to quiet her. The cause of the commotion turned out to be this: The deck hands had been cleaning down the decks and as they finished one of them said to his companions: "There, that settles it, and we'll all go down together"—meaning of course that they would go to their quarters below. The woman heard him and at once imagined that the ship was going to the bottom, deck hands and all.

We had many notables on the Royal George coming over, among them Sir William McKenzie, president of the Canadian Northern Steamship Company, Sir Lomer Gouin, premier of the Province of Quebec—who graciously presided at the concert—and many others. The commander, Captain F. J. Thompson, R. N. R., was a man of the right type. He evidently felt the responsibility of having so many passengers in his charge, and during the fog and iceberg area he never left the bridge for thirty-six hours except for one brief respite. It was during this time that we nearly hit the berg, after which he stuck to his post till we were safe past the straits of Belle Isle. The passengers appropriately presented him with a complimentary address and a gold watch.

In conversation with Sir William McKenzie the day following the iceberg experience he informed me that the ship had stopped within her own length when the propellers were reversed. She surely felt as if she were doing something.

There was one minister on board from Omaha, Nebraska, who impressed me as being one of the Simon-purest men I ever met. It is always customary on a British ship to hold religious services on Sunday. To the captain falls the duty of reading the service, but I have always noticed that the captain ditches this function whenever he can, and presses some minister into service. On this occasion a committee approached the Omaha man with the request that he officiate. His reply was in substance as follows: "I know you do this to compliment me, but while I appreciate your motives I am not complimented. I would much rather you would get some other minister on board who does

not feel as I do about it." This was such a peculiar attitude for a minister to take that some one ventured to ask the reason. "Well," said he, in a quiet, gentlemanly way, "to be perfectly frank with you I haven't the highest opinion of the religious zeal of those who are likely to go down in the dining saloon and sit there sanctimoniously while the service is being read. The people on this boat who are practicing real religion are the captain and his splendid officers and crew who are faithfully standing at their posts and making it possible for us all to get safely to port."

When I heard of this I went and took that minister by the hand, because I always did believe more in good works than in faith. And then besides I had some vivid recollections of services at sea where those making the most unctuous responses were known to be the meanest cusses on the boat. In one instance on the Pacific I particularly noticed two men who were apparently entering heart and soul into the ritual, and who evidently had the prayer book by heart. Immediately after the services I learned that they had a bet up between them on the length of the sermon and one of them was grouchy because he lost. He wasn't even a good sport.

As we passed Labrador and Anticosti and swung down into the gulf of St. Lawrence the perilous part of our trip was over, and the ride up the St. Lawrence River was delightful. We were no longer fearful of German cruisers, or icebergs, and so far as fog was concerned we did not encounter a bit after we left Anticosti.

I shall always have a peculiar affection for the good ship Royal George. She brought my family and myself out of a difficult situation and landed us safely on the best continent under the sun. While this last phrase was written on impulse, yet it is a profound and literal fact that the North American continent is the most favored spot on earth. I have been to other parts of the world and I know. It is not that I was born here, and have lived here all my life, though this of course endears it to me in a sentimental way. But I trust that I am not provincial enough to be blind to the virtues of other lands, and I am conservative when I say that in no other country can a man so safely and surely follow the pursuits of happiness and achieve-

ment, unmolested by the disastrous effects of internecine and international strife, and unhampered by political and religious persecution, as he can in the United States and Canada.

Europe on account of the propinquity of so many different principalities has from time immemorial been the seat of the most atrocious and devastating wars, and with the spectacle of the present horrible and bloody struggle before us it would almost seem hopeless for her to ever achieve a permanent and reassuring peace. Before this war broke out I was one of those who claimed that such a thing was impossible, that our present-day civilization would never tolerate it, but I had not been to Europe when I said that. My visit there has set back my ideals of a real civilization a thousand years. It may be that the appalling enormity of the present tragedy will force open the eyes of the leading men of the world, and move them with a common purpose to insist on a universal plan for the settlement of all disputes other than the arbitrament of war. And yet—and yet, I hark back to other wars, and I recall the same stereotyped statement made after each one of them: "This is the last great war."

Oh, humanity, humanity, you have struggled up and up from the barbarism of the brute, fighting your way inch by inch for personal liberty and personal rights, for national aggrandisement and national glory. You have fought because you knew no better way, because all down through the ages you have blindly subscribed to the unholy tenet that might is right. You have fought because of the brute there was in you, because you had not advanced far enough yet to fathom the unflinching fact that no permanent advantage was ever gained by bestial force. You have fought because you were mad—the madness which blinds men to the supreme truth that nothing survives in the evolution of the universe save law and order. You have committed crime after crime against yourselves, all the while holding your hands to high heaven in supplication for a sovereign remedy, a remedy which lay at your very feet.

And now after all these ages of strife and stress, after all the agony of the dismal past, and of the present dark and dreary scourge of war, may we not hope that you will awake from your

long and bloody dream, and washing the stains of centuries from your dripping hands resolutely turn your face toward the glowing east and beckon in the dawning of a brighter and a better day.

C. N. J.

(The end.)

BOOK REVIEWS.

A WORK ON SPECIAL DENTAL PATHOLOGY, Devoted to the Diseases and Treatment of the Investing Tissue of the Teeth and the Dental Pulp, Including the Sequelae of the Death of the Pulp; also Systemic Effects of Mouth Infections, Oral Prophylaxis and Mouth Hygiene. 518 Illustrations. By G. V. BLACK, M. D., D. D. S., Sc. D., LL. D., Dean and Professor of Operative Dentistry, Dental Pathology and Bacteriology, Northwestern University Dental School. 489 pages. Price \$6.00. Published by the Medico-Dental Publishing Company, Chicago, Ill. 1915.

Ever since Dr. Black began the preparation of this work five years ago those of the profession who knew of it have been patiently waiting for its appearance. Now that the book is out the reviewer finds it difficult to do it justice because of the wealth of material and the fact that it contains so many distinguishing features. The reader is given a vivid insight into the character of the tissues involved, thus preparing him for a recognition of the pathological changes which occur as the result of the various diseases discussed. The diseases embrace every known affection of the supporting structures of the teeth together with a detailed consideration of the diseases of the dental pulp. Nowhere in our literature is there so clear a statement of this subject as Dr. Black has given us in this volume, and the work is very timely in view of the many misconceptions regarding such subjects as pyorrhea alveolaris (which term, by the way, Dr. Black discards in order to better discriminate between the several diseases coming under this group), oral prophylaxis, focal infections, etc., etc. It is refreshing to read an author whose sanity prevents him from being carried away by every passing fad, but who is sufficiently progressive to bring his work quite up to date.

To consider, even briefly, the various subjects treated in this

book is hopeless within the limits of a review, and yet we must not dismiss the matter without a special reference to the illustrative character of the work. The X-ray reproductions are most excellent, a distinctive feature being some panoramic radiographic views of the entire upper jaw with teeth in place, showing bone absorption around the roots of the teeth. There are also some colored plates which are beautifully executed.

The book is a classic in its line, and will take its place beside the previous masterly works of this author. One thing of all others impresses the discriminating reader—the marvelous character of the phraseology. In no previous work of Dr. Black's, with all their clearness of diction, do we find such rich and distinctive English as is manifest throughout this book. It shows not only the trend of thought of the true scientist, but the rare vocabulary of the ripened scholar; and to read the book merely for its diction and entirely aside from its scientific value would be far from a waste of time. We commend the book most highly with the conviction that its perusal by the profession will result in a distinct advancement in the aggregate knowledge of the subjects treated.

PRACTICAL HINTS.

Edited by J. E. Schaefer, D. D. S.

(This department is for busy readers. We want short articles containing practical hints—the shorter the better. No article must exceed 200 words, unless of exceptional merit. Every dentist has some useful hint that has been of value to him, and if he will only put it in print it may be of equal value to others. That is what this department is for. Due credit will be given for every article sent. Address J. E. Schaefer, 1745 W. Harrison St., Chicago, Ill.)

The Question of Extraction:—In the insertion of an upper denture, the question of extraction of certain teeth simply is resolved into this solution:

The time has come when the patient must wear a plate, and what shall be done to make the denture the most comfortable and useful? If the extraction of certain teeth is needed, extract, explaining to the patient the reason.—*L. P. Haskell, Chicago, Ill.*

Sterilizing Pyorrhea Pocket:—You will agree with me, that if it can be demonstrated that by placing an electrode into a pyorrhea pocket and by passing a few milliamperes of current for a few min-

utes, it is possible to impregnate the tissues, to a considerable depth with ions of a salt, which have been proved to be of high antiseptic nature, that this must be an effective means of sterilizing the tissues.—*E. Sturridge, D. D. S., L. D. S., England.*

Pain:—We as practitioners are most likely to associate pain with an inflammation, or an ulceration, or from a sudden or gradual solution of continuity in any of the tissues of the mouth. It is, however, frequently experienced in a severe form when none of these conditions are present; therefore when we proceed to consider pain from a diagnostic point of view, we should preface this observation by asserting that pain, whether local or general, may be illusive as to both seat and cause. In addition to what has already been said we must view with some reservations these phenomena as they are exhibited in individuals.—*J. G. Reid, D. D. S., Chicago, Ill.*

Bad Practice:—Removing the second molar to make room for the third molar is often done; this will frequently relieve the patient of further disturbances. This procedure I unhesitatingly condemn as the second molar is an important organ in mastication and should be preserved. The removal of an impacted third molar should not be undertaken with forceps as such methods are violations of surgical principles and permit of much trauma and oft-times are the beginning of serious infection, with its disastrous consequences. I will attempt to briefly describe my method of removing impacted third molars.—*M. N. Federspiel, D. D. S., M. D., Milwaukee, Wis.*

Carcinoma of Tongue:—On the tongue, there are probably five conditions that may be the initial stage of a developing carcinoma: a little hard lump rising deep under the mucous membrane, a crack or a tooth ulcer which does not heal and the edges of which show a little chronic induration. Such a crack that does not heal may develop in a leukoplakia. There may come a plaque on the surface of a leukoplakia that may be the early form of the cancer. The most common and characteristic is a wart, and it is probable that a wart developing on the tongue of a person over forty years

of age is an early form of cancer. A wart developing in a leukoplakia is always a cancer.—*V. B. Blair, M. D., St. Louis.*

Synthetic Inlay:—A synthetic inlay can easily be made for cervical cavities where it is torture to the patient to apply dam.

Prepare the cavity as for any other inlay. Take the impression with any good inlay wax. After removing impression, mix plaster and with a camel's hair pencil, brush a coating over the impression, then add plaster with spatula, until you have sufficient to handle easily. After plaster is hard, separate and trim to cavity margins. Dry thoroughly then mix synthetic of shade desired. Place in plaster matrix and compress by drawing celluloid strip tightly around it.

Allow it to set from forty to sixty minutes, then drop in water and in a few minutes you can easily remove inlay when it is ready to set and finish.

Matrix should be coated with a thin solution of liquid. Silax after it is separated from impression.—*F. C. Noyes, D. D. S., Jacksonville, Ill.*

How often the dentist will request the patient to have the lower third molars removed and leave the uppers without contact, or vice versa. Having no occlusion it elongates and is not kept clean. This means a cavity in its mesial surface, which decays the distal of the second molar. Extraction of the third molar at the proper time would have prevented the second molar from decaying.

The trend of the profession now is for prevention by prophylaxis, then, why should we leave third molars in and allow the second molar to be attacked, If extraction of the third molar at an early stage would enable the patient to take better care of the second molar, why not remove it? This does not apply to patients who early in life have lost the first molar. In these cases the second molar will move forward and take the place of the first molar. When there is a space between the second bicuspid and the second molar, however, the third molars should be retained.—*A. Brown Allen, D. D. S.*

Mandibular Anaesthesia with Novocain-Suprarenin:—Absolute asepsis and knowledge of the anatomy of the parts is essential to success. The Fischer syringe with iridic platinum needle is used.

Sterilize the needle by heating over an alcohol ame. Boil the syringe in Aqua Dist. and keep immersed in absolute alcohol.

The solution is freshly made by adding one tablet E (Farbwerke-Hoechst) to each C. C. Ringer solution, four C. C.'s are used. This gives a 2 per cent Novocain solution. Sterilize the field of operation by scrubbing with Aconite and Iodine.

The inferior dental and lingual nerves are to be anaesthetized.

Locate the internal oblique line with the forefinger—pierce the tissues high up on this line—insert needle without pressure to mandibular sulcus—continually injecting and moving needle forward and back. Deposit bulk of solution over the inferior Dental foramen. In injecting follow internal surface of the ramus—the open side of the needle should face the bone and it must be high enough to pass over the lingual.

Operate after twenty minutes. The whole half of the mandible will be anaesthetized to the centrals, and the anaesthesia will last at least an hour and a half.—*F. W. Rounds, D. D. S., Louisville, Ky*

The Preparation of a Tooth for a Porcelain Jacket:—1st. With stones remove all enamel from your tooth and more if necessary to get alignment. If part of tooth structure is lost, I would rebuild with a cast filling or cement—never with amalgam.

2nd. After stripping your tooth of enamel, make a copper band or cup contoured at the gingival, just as for gold crown, except that the band should be longer, so it can be pinched together or otherwise closed at the incisal end. Fill this cup with Detroit Modeling Compound.

3rd. With a small plain fissure burr ($57\frac{1}{2}$ or 58 Revelation Burr) cut a shoulder just the depth of the width of the burr, into the tooth, below the free margin of the gum. Have this shoulder smooth and regular, in outline.

4th. Tooth being prepared without undercuts, oil or vaseline it. Dry heat your cup of Detroit Modeling Compound and gently force it over the shoulder on the tooth until you have an accurate impression of both the inside and outside angle of the prepared shoulder. Chill under pressure and remove carefully.

5th. Soften extra tough pink wax (Tenax preferred) and take an accurate mush bite. Chill and remove carefully.

This carries one up to the point where the Technic of the Building of a Porcelain Jacket Crown begins. This I will reserve until some future Clinic.—*A. E. Schneider, D. D. S., Chicago, Ill.*

The Retention and Burnishing of Matrices for Porcelain Inlays:—In the cavity preparation, I aim to get at least two walls parallel to each other, and when possible, I shape the cavity so that the inlay, when finished, will slide in from only the direction from which the stress of mastication is exerted.

In burnishing the matrix, the platinum is carried to place between two pieces of thin china silk, which enables one to carry the platinum to the bottom of the cavity without tearing it. In burnishing, always begin by using a rotary motion near the margins of the cavity, gradually working down into the deeper portions, or, in other words, sort of spinning the platinum into place. The matrix will sometimes break in the bottom of the cavity or in some important retention angle. These breaks can be patched by placing a small piece of platinum over that portion and burnishing it into place; solder with a small thin piece of pure gold; I use a little piece unrolled from a Rowan's or Pack's cylinder. After soldering, the matrix is carried to place, reburnished and finally swaged to place with sticky wax. The wax is put into the matrix hot enough to stick to the platinum, then allowed to cool to a thick putty consistency, when it is pressed firmly to place. This swages the matrix and eliminates the danger of distortion in its removal. The wax is burned out by laying the matrix on a block of clean charcoal, wax side up, and bringing it to a white heat with a blow pipe. Shellack varnish is used on all margins of the matrix, which, as soon as the varnish is dried, is filled with porcelain and baked.—*F. H. Skinner, D. D. S., Chicago.*

OBITUARY.

DR. JAMES BRANSTON WILLMOTT.

DIED: At the General Hospital, Toronto, Canada, on June 14, 1915, Dr. J. B. Willmott, Dean of the Royal College of Dental Surgeons, at the age of 78.

In the passing of Dr. Willmott the profession of Canada loses its most distinguished member. He may well be called the Father of Canadian dentistry, having been connected in an official capacity

with, and as a commanding figure in, the councils of the R. C. D. S. as far back as 1870. He saw the profession grow from a small body of unorganized men to a large body of one of the best organized professions in the world, and in this development it is not too much to say that he was one of the chief factors. To write the achievements of Dr. Willmott would be to practically write the history of the growth of dentistry in his native land, but probably the thing most outstanding in his professional life was his relation to the large student body who passed year by year under his guardian care. Every student who has been graduated from the R. C. D. S. came under his supervision, and it was not only in his capacity as a teacher that he exerted the greatest influence, but in his personality as an exemplar of the highest type of morality and correct living.

Never was the profession of any country more fortunate than was that of Canada in its early days in having such a man as Dr. Willmott at its head. No smirch of dishonor ever attached itself to his name, and the example he set for the young man entering the profession was one of the dominating factors in bringing about the splendid *morale* of the rank and file of the present profession of Canada.

A volume might well be written on the achievements of this man, but in the hurry of preparing for press, the present writer must content himself with a brief personal tribute, and leave for others the function of a more formal statement of his attainments. Dr. Willmott was the writer's first teacher of operative dentistry. It was from his lips that he listened to his first lectures in a dental college. It was to him that he went for counsel in his early days of practice, and when he himself was called upon to teach he straightway journeyed to his old professor for suggestion and guidance. His measure of debt will never be paid, but in the years that are gone the old teacher at least was made to know that the young teacher valued his advice and cherished his friendship. In all the relationships of professional life there is nothing more beautiful or sacred than that of teacher and student, and it is this relation, coupled with the friendship of the passing years, that binds the heart of the one who writes to the blessed memory of the one who is gone. In tender tribute, with head bowed low, he breathes a benison for his dear departed friend.

C. N. J.

MEMORANDA.

UTAH STATE DENTAL SOCIETY.

The Utah State Dental Society want to entertain all dentists who visit Salt Lake or Ogden. Please notify Dr. Earl G. Van Law, chairman entertainment committee, 913 Walker Bank Building, Salt Lake City, Utah.

F. D. I.

The next meeting of the International Dental Federation will be held September 2-3, 1915, at San Francisco, California. Headquarters will be at The Clift Hotel. Truman W. Brophy, President. Burton Lee Thorpe, Assistant Secretary, 3605 Lindell Blvd., St. Louis, Mo.

A NEW DENTAL JOURNAL.

We are just in receipt of the first issue of a new journal, *The American Dentist*, published at 458 East Forty-seventh street, Chicago. The manager is R. A. Weston Arnold, the editor-in-chief is Dr. George Wallace Winslow, with associate editors, Drs. W. H. O. McGhee, C. E. Frazier and B. Holly Smith. We hasten to welcome this new publication into the ranks of dental journalism, and to offer our congratulations to the editor and his staff on the first number. It is a very readable and interesting issue, and we wish the journal the greatest measure of success.

THE COMMITTEE ON THE NECROLOGY OF THE MEMPHIS DENTAL SOCIETY REPORTS AS FOLLOWS:

Whereas, it has pleased our God and manager of all things to remove Eugene A. Johnson by death, the commonwealth has lost a worthy citizen of the highest type and our profession an eminent and highly respected member who, throughout his career was ever among the foremost in working for the advancement of his fellow men.

Dr. Johnson was an earnest worker for higher ideals in dentistry. He was an earnest and forceful teacher and was highly appreciated by his confreres in the faculty of the University of Tennessee College of Dentistry, with whom he had been associated for several years.

In all professional and society work his counsel and ability to perform were greatly appreciated. By his death the Memphis Dental Society feels that it has sustained an irreparable loss.

Therefore, we *resolve* to give expression to our sorrow and feeling of loss caused by the sudden culmination of this brother's noble career. We also wish a copy of the above sent to the bereaved family and to the journal for publication.

J. D. TOWNER,
D. M. CATTELL.

CANADIAN ARMY DENTAL CORPS.

The most signal evidence of the recognition on the part of military authorities of the importance of dental service in the welfare of the army is contained in the organization of a Dental Corps in the Canadian army for overseas service, operating as a separate unit and not under the Medical Corps; the Dental Corps to have suitable rank, as will be seen by the following statement, kindly furnished by Lt. Col. J. Alex. Armstrong, Chief Dental Surgeon:

On March the 15th a committee from the Canadian Dental Association waited on Major General, the Honorable Sam Hughes, Minister of Militia and Defense for Canada. The committee was received most courteously by

the minister who was already possessed of the necessity of such an organization, and promised that recognition would be given.

On March 29th, 1915, the first order regarding Dental Service (Order No. 162) appeared. On April 2nd, Dr. J. Alex. Armstrong was appointed Chief Dental Surgeon, to organize and command the corps, and on April 8th, the proposed establishment was in orders without a single change.

No time was lost in preliminaries and matters have been rushed to such an extent that the first corps for overseas service was completely mobilized on June 7th.

The following is an extract from militia orders, No. 162, of 1915.

CANADIAN EXPEDITIONARY FORCE—DENTAL SERVICES.

Where practical, steps are to be taken to have the teeth of all officers, non-commissioned officers, and men of the expeditionary force examined and put in proper condition to the extent of all extractions and amalgam fillings before the contingents leave Canada for overseas service, and temporary appointments should be made for this service as occasion requires.

To ensure that the men's teeth are kept in proper condition during the period of the war, the following details are authorized for employment on this service:

One officer in charge of all Dental Surgeons, to be attached to divisional headquarters and to be under the direction of the officer commanding the division. This officer will be designated as "Chief Dental Surgeon."

One Dental Surgeon for each brigade of mounted rifles and artillery (including divisional ammunition column).

Two Dental Surgeons for each brigade of infantry.

These officers to be attached to the brigade headquarters.

One Dental Surgeon for each field ambulance, stationary and general hospital, and

One Dental Surgeon for the base hospital for medical stores to take charge of stores and equipment.

One Dental Surgeon for units not otherwise provided for, to be attached to divisional headquarters and under directions of Chief Dental Surgeon.

Each Dental Surgeon to be entitled to two men, one to act as orderly and one man as servant or groom.

SUGGESTED RANKS FOR OFFICERS OF DENTAL CORPS.

The chief officer in charge to have rank of Lt.-Colonel; the senior officer with each division to have rank of major; officers with field ambulance and hospitals to have rank of Captain; remainder of officers of the corps to be Lieutenants. The orderlies to be Sergeants and Corporals in accordance with qualifications and service.

EXAMINATION OF DENTISTS FOR THE U. S. ARMY.

The surgeon general of the army announces that examinations for the appointment of Acting Dental Surgeons will be held at Fort Slocum, New York; Columbus Barracks, Ohio; Jefferson Barracks, Missouri; Fort Logan, Colorado; and Fort McDowell, California, on Monday, October 18, 1915.

Application blanks and full information concerning these examinations can be procured by addressing the "Surgeon General, U. S. Army, Washington, D. C."

The essential requirements to securing an invitation are that the applicant shall be a citizen of the United States, shall be between 21 and 27 years of age, a graduate of a dental school legally authorized to confer the degree of D. D. S., and shall be of good moral character and habits.

Acting Dental Surgeons are employed under a three years' contract, at the rate of \$150.00 per month. They are entitled to traveling allowances in obeying their first orders, in changing stations, and in returning to their homes at termination of service. They also have a privilege of purchasing certain supplies at the army commissary. After three years' service, if found qualified, they are promoted to the grade of Dental Surgeon with the rank of first lieutenant, and receive thereafter the pay and allowances appertaining to that rank.

In order to perfect all necessary arrangements for the examination, applications must be in the possession of the Surgeon General at least two weeks before the date of examination. Early attention is therefore enjoined upon all intending applicants. There will be twelve vacancies to be filled.

A SILVER LOVING CUP FOR THE DONORS OF THE FORSYTH INFIRMARY.

In the building and endowment of the Forsyth Dental Infirmary for Children, the dental profession has received an uplift that is world wide. No one who views this institution erected for the betterment of uncounted generations of children yet unborn, can but be impressed with the unselfish character of the man who made the gift and also the two brothers left to carry out his wishes. One of these has since passed away and there remains Thomas A. Forsyth whose duty and pleasure it has been to add to and embellish the original plan. Today this institution stands as a permanent memorial with an endowment of a million and a half, enabling the trustees to not only conduct the work of caring for the teeth of the worthy poor but to enter the research field and thus it is to be a beacon light and standard so long as it shall endure. The editor suggests that the dental profession secure by subscription among its members, an amount of money sufficient to purchase a beautiful loving cup which shall be placed in the donor's room of the Forsyth Dental Infirmary and there remain for all time, a token of our appreciation. To properly represent the dental profession it should have the united support and indorsement of every dental society and dental journal in the land.

Will you present this subject before the next meeting of your state society and see that it is brought before the meeting of the National Dental Association and the Panama-Pacific Dental Congress? Do not let us adjourn these meetings without taking steps that will make this presentation of a loving cup an accomplished fact. To do less will be a disgrace.

TRANSPORTATION.

The members of the Transportation Committee of the National Dental Association, adopted three official railway routes and schedules to San Francisco from the East, and are now engaged in calling the attention of the profession to the schedules planned. Members of the committee are located in different sections of the states, and are prepared to give members of the profession in their localities, general information regarding the railway routes, fares, etc.

The railway trains scheduled as arranged by the committee going to San Francisco have special equipment and train service. The routes are popular, the trains are of the most comfortable cars; the arrangements being complete, insures pleasant associations and encourages good fellowship.

The railway itinerary of the official trains as published in the February number of the DENTAL REVIEW, page 203, should be examined carefully by all that are intending to make the trip, as the plan adopted in employing our special and official trains is to encourage comfort in transit and general good fellowship. The committee suggests that one should confer with their local railway agent, or one referred to in our itineraries, and choose a route for their return trip, which is necessary before purchasing a reduced fare ticket.

The committee request that editors of all dental journals, officers of state and local dental societies and all members of the profession do what they can to interest members of the profession in joining us in our trip to attend the Congress and in that manner add to the attendance and assure the success of the Congress.

Transportation Committee National Dental Association: Dr. Victor H. Jackson (Chairman), 40 E. 41st St., N. Y.; Dr. H. F. Hoffman, 324 Metropolitan Bldg., Denver, Colo.; Dr. Jos. B. Eby, 509 Fourth National Bank Bldg., Atlanta, Ga.; Dr. D. C. Bacon, Columbus Memorial Bldg., Chicago, Ill.; Dr. Henry W. Weirick, 503 Mechanics Bldg., San Francisco, Cal.; Dr. J. P. Marshall, 7401 Hazel Ave., St. Louis, Mo.

PANAMA PACIFIC DENTAL CONGRESS.

The Committee of Organization of the Panama Pacific Dental Congress desires to call the attention of the members of the dental profession to the fact that the Congress will convene on time in San Francisco, on August 30th, under most favorable conditions for holding a large and successful meeting.

The program of papers and clinics is almost complete and covers in a most comprehensive manner practically every subject pertaining to the practice of dentistry and oral surgery. About one hundred papers and two hundred and fifty clinics, or more, will be presented. Among the leading essayists and clinicians will be, Truman W. Brophy, H. S. Dunning, M. H. Cryer, C. H. Oakman, Rudolph Weiser, of Vienna, Austria; A. B. Baer, T. B. Hartzell, H. M. Sherman, T. E. Carmody, W. H. G. Logan, H. P. Carlton, Prof. Bornsdorff, of Finland; E. F. Leffler, Garrett Newkirk, Herbert L. Wheeler, Louis Ottofy, Guy S. Millberry, M. L. Ward, I. N. Broomell, H. E. Friesell, V. A. Latham, F. B. Noyes, Josef Novitsky, C. H. Wilson, F. W. Hergert, C. J. R. Engstrom, V. E. Mitchell, Hart J. Goslee, J. Leon Williams, Alfred P. Rogers, A. H. Ketcham, E. L. Stanton, Weston A. Price, Louis Subirana, of Madrid, Spain; R. Ottolengui, M. L. Rhein, H. A. Pullen, Vincenzo Guerini, of Italy; Joseph Nolin, Montreal; W. H. Fitzgerald, Chas. McManus, C. O. Simpson, M. J. Congdon, R. B. Giffen, H. G. Chappel, Th. Weber, of Finland; A. C. Wherry, John V. Conzett, F. W. Gethro, Edwin R. Kibler, Richard H. Riethmuller, T. Sydney Smith, Robin Adair, H. Page Bailey, Wm. A. Capon, L. P. Haskell, Jules J. Serrazin, V. H. Jackson, W. H. O. McGehee, Arthur C. Peck, E. A. Bogue and many others.

As far as possible no night session of the Congress will be held, leaving the evenings free for entertainment and the Exposition.

Over 1,200 front feet of space will be occupied by the leading dealers and manufacturers of the world with one of the most comprehensive exhibits of dental and pharmaceutical goods ever shown.

All the sessions of the Congress, the meetings of the sections, component societies, and the exhibits, will be held under one roof, in the Municipal Auditorium, one of the most magnificent structures of its kind, affording every opportunity for the effective and comfortable presentation of the program.

The Committee of Organization is sparing neither time, labor nor money, to make the Congress the most notable event of its kind in the history of dentistry. To have missed it will be the regret of a lifetime. Transportation and hotel accommodations will be within the reach of all, and should be secured at once. Over 1,000 applications for membership are now on file with the committee. Those who have not filed their application should do so now, that arrangements may be made for their accommodation and entertainment.

No one interested in the history, progress and practice of dental science can afford to miss this great opportunity to attend the congress and at the same time visit the greatest International Exposition the world has ever seen.

THE DENTAL REVIEW.

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CHICAGO, AUGUST, 1915.

No. 8

A TALK ABOUT DENTAL RADIOGRAPHY.*

BY HOWARD R. RAPER, D. D. S., INDIANAPOLIS, IND.

The dentist, the physician and the radiographer, all are struggling to meet a situation. What is the situation?

The radiograph is showing us that there are more chronic dento-alveolar abscesses, Horatio, than were dreamed of; and the internists and research workers tell us these abscesses are the source of metastatic infections, and so responsible for arthritis, endocarditis, nephritis, gastritis, cholecystitis, and other inflammatory diseases. Stating the situation a little differently and making it, I believe, a little clearer, the radiograph is constantly revealing conditions of the mouth which the research worker says may and do cause infinite suffering and death.

Do we believe what the researcher tells us? We should either believe him or give good reasons for our disbelief. So far no one has been able to give good reasons for a disbelief in his theory, and so, while we may not accept all his deductions and conclusions, we are forced, if we wish to be classed as logical and reasonable, to accept his theory.

Just to exercise your imagination now, suppose you wished to have an alveolar abscess. How would you go about getting one? They may be obtained in one of two ways: either by staying away of dentists, or by going to them. Which paradox, like the sticking-plaster heart on the fair maiden's cheek, is used simply to attract attention. To elucidate: The individual with decaying teeth, who never goes to a dentist, is sure to have dental abscesses, and the individual whose dentist does not treat pulp canals aseptically, also is sure to have dental abscesses, because his dentist will

*Read before the Chicago Dental Society.

not only fail to cure existing abscesses, but may actually create them.

Taken as a whole, is the pulp canal treatment work of the dental profession good or bad? I take the stand that it is bad; and, making observations from this stand, let us see why it is bad.

First, until recently, nobody—neither dentists, physicians nor scientists—realized the serious necessity of doing better canal treatment. The idea that an improperly treated tooth might produce invalids, cripples and death was unheard of until Dr. Hunter, of London, brought it to the attention of the medical and dental professions.

Second, it has always been and still is an economic impossibility for the average man to do good dental treatment work for the *average patient* for the *average fee*, without, at the same time, reducing his income to a pitifully small amount.

A remark of this kind is the cue for some member of the profession, who has solved the problem of better treatment of teeth by charging anywhere from twice to five times as much as the average fee, to arise and say, "This matter of fee has nothing to do with good canal work."

Is it true that the excellency of treatment work is in no way governed by the fee charged for it? Let us see: Suppose the men who are doing the best treatment work should make no change in their methods but should accept only the *average fee* for their services. Or suppose the men who are receiving average fees should adopt the methods of Callahan and Best.

You see I do not come to you to tell you how to increase your income. We are looking into the why of bad treatment work and I reiterate that one of the causes is that better treatment work for the present average fees charged for it, is an economic impossibility.

The third cause of unsuccessful treatment of teeth is the extremely difficult technic involved due to unfavorable physical or mechanical conditions.

The writer having decided, from his experience in dental radiographic work, that the average pulp canal work of the dental profession is not up to a sufficiently high standard of excellency, and having told you the causes of the condition as he sees them, now finds that he must be a very young man; for he wants to give

advice. He wants to advise everybody in sight—physicians, dentists and radiographers—but, thank Heaven, he is not so young that it will hurt him if nobody accepts or acts on his advice.

A definite limit placed on the length of this discourse by your sensible officers makes it necessary for me to give this advice in the form of rather pert paragraphs, with little or no elucidation.

TO PHYSICIANS.

1. Shoulder up your share of the responsibility for the occurrence of local foci of infection in the mouth.

2. Do not advise the extraction of two teeth because one tooth is abscessed—nor of all teeth because some are abscessed.

3. Never advise extraction without first making radiographs.

4. Have an expert read the radiographs, or pass on your reading, until you have become expert.

5. Do not say all teeth with the pulps removed should be extracted, for we do not know that this is true.

6. Do not forget that teeth have an important function. This is just as much a truth as it ever was. Keep it in mind.

7. Wake up to the fact that to learn what you should know of this subject you must hear what dentists have to say about it. Invite them to lecture at your meetings and in your schools.

8. Keep this in mind: The dentists of the United States have developed a Research Commission which will rank with Carnegie and Rockefeller Laboratories for Research.

9. Remember that most of the diseases of infancy were once attributed to teething.

TO DENTISTS.

1. Do not jiggle about, and try to sidestep the situation.

2. Support the National Research Commission with your heart, mind and money.

3. Let the apical excision, or currettement, operation become a common one, not an uncommon one.

4. Admit that the destruction of pulps has been ruthless, and as you admit it correct the mistake.

5. Develop a new and better bridge work. Bridge work is not to be relegated to the scrap heap—but it should be modified.

6. Never expect to hear again the man who came to your meeting and said he "filled all canals to the apex."

7. Admit it is impossible to reach and fill to the apex all canals. No man can do it by the methods you now use.

8. Look to the National Research Commission to learn if you should extract teeth when it is impossible to fill the canals to the end.

9. Know that it is not a crime to fail to fill a canal perfectly, but that *it is a crime* not to try to fill it.

10. Charge for the treatment of teeth on a time basis and render a bill whether you save the teeth or not.

11. Discontinue the use of proprietary preparations for canal filling and look to the National Research Commission to make public the formulæ of these preparations.

12. Change your slogan from "Save Teeth" to "Save Teeth"—*but never at the expense of producing a chronic abscess.*

13. Do not depend on medical men to make and read your radiographs for you.

TO RADIOGRAPHERS.

1. Do not read a diagnosis into every radiograph whether it is there or not. Learn to say, when it is the case, "The radiograph shows me nothing."

2. Believe in the infallibility of the radiograph, knowing it is the product of definite and unchanging chemical and physical laws, but realize that, unless you know these laws, it may mislead you.

3. Never deny the assertion that radiographs have unfortunate limitations. Though the radiograph is the greatest single aid to dental diagnosis, it nevertheless fails often to show us what we want to see.

4. Understand the necessity of making more than one radiograph of a single case. When in doubt, verify with another radiograph.

5. Distrust any radiographic finding that is not backed up by the clinical evidence.

6. Do not profess to be a dental radiographer unless you are a dental pathologist.

7. Try not to blame the radiograph for your occasional silly interpretations of it.

8. Know the following as the list of the most common misinterpretations of radiographs:

(A) To mistake the anterior palatine foramen for a dento-alveolar abscess of an upper central incisor.

(B) To mistake the mental foramen for a dento-alveolar abscess of a lower bicuspid.

(C) To mistake the maxillary sinus for a dento-alveolar abscess of the upper bicuspids or molars.

(D) To assume, from the appearance of single radiographs (not stereoscopic radiographs) that the roots of teeth penetrate into the antrum, when the appearance of this condition may be due to distortion, or lapping, of the roots to the buccal or lingual of the antrum.

(E) To mistake the mandibular foramen for osteoporosis, due to disease.

(F) To mistake a small cervical filling for a pulp nodule.

(G) To assume that a canal filling in an upper tooth fails to reach the end of the root when this appearance of a faulty canal filling is due to the relative positions of tube, film and tooth at the time of exposure.

9. Understand that it does not fall within the province of radiographers to be harsh critics of either dentists or physicians. Your position is a delicate one. Handle it with patience, kindness, coolness and honesty. Do not try to turn things upside down all at once.

TO PHYSICIANS, DENTISTS AND RADIOGRAPHERS, ALL:

Let us all appreciate the necessity for team work. The tendency to clannishness in the human being is fundamental. The boys of the east end hate the boys of the west end. Knowing this human fault of clannishness, let us guard against it.

When a man of one profession meets a bonehead of another, do not attribute the osseous condition of the man's head to the profession of which he is a part.

Let us realize that to the best of our present knowledge, if teeth are properly treated they do not abscess.

Therefore, they must be treated properly.

If teeth are to be treated properly there must be a raise in the average fee charged.

People turn from good dental treatment on account of the cost, and indeed and actually very many of our American people cannot

afford to have their teeth treated properly. What is to become of them? Some one answers, "Extract their teeth." The answer is that the medical profession has tried to persuade women not to wear corsets ever since we can remember, but women wear them just the same. Likewise, it will be found impossible to induce poor people to give up their anterior teeth. They will go to the dental quack. And what if we expose the quack and destroy him? It would be a good, though difficult, thing to do, but the point is that we do not want to extract teeth; we want to save them.

The solution of the whole problem lies, not in the development of an inexpensive method of treating pulp canals, which it seems to me, is impossible, but in a publicity campaign which will lessen the necessity for treating canals.

Do people really know that they save health, pain, money and time by having their teeth filled before they ache? In a hazy sort of way they do; but they do not know it well enough, and it is our fault that they do not. We must teach them.

Our slogans are changing. We no longer say, "Swat the fly"; we say, "Prevent the fly"; we do not say, "Reform the criminal," but "Prevent the criminal." We talk little about "curing tuberculosis," but much of "preventing it." So let us not only improve our pulp canal treatment work, but do the bigger thing, and try to prevent the conditions which make pulp canal work necessary.

(Explanatory lantern slides followed.)

SILICATE CEMENTS AND THEIR POSSIBILITIES.*

BY C. H. WAACK, D.D.S., CHICAGO.

One of the most difficult problems for the dentist to solve is the selection of a filling material for cavities in the proximal and gingival surfaces of incisors and cuspids. This can be readily and perfectly accomplished with gold foil, but it is undeniable that the display of gold is objectionable, and the progress of our modern civilization demands, that we not only restore teeth to their full usefulness, but also disguise from view the evidence of our operation.

*Read before the Chicago Dental Society, March 16, 1915.

Until a few years ago we had only gold and porcelain to select from for this class of cavities. After about four years of practical experience and close observation, I have the courage of conviction to say that with proper manipulation and care, silicate cements, as furnished us by the manufacturers today, may be safely added to the list, and by studying carefully the indications for their use they will do much towards making esthetic dentistry a reality.

The manipulation of silicate cements requires no special skill, but unless the strictest attention is given to the proper temperature of the mixing slab, we will not get uniform results. It has been satisfactorily demonstrated that a slab at 60° F. gives us the proper reaction. If the temperature of the slab is much higher, reaction will take place before a sufficient amount of powder can be incorporated into the liquid to give us the proper density of the finished product.

About nine months out of the year we should have little or no trouble in this respect if we follow the advice of Dr. Ames, who suggests that a heavy mixing slab, or better still, a blake bottle of suitable size filled with water and containing a thermometer be kept in an ordinary porous flower pot filled with clear water, as the evaporation therefrom tends to keep the temperature of the slab about 10 deg. below that of the atmosphere, thus giving us a temperature near enough to 60 deg. F., and above the point at which moisture will not condense.

It so happens that the more the necessity for chilling the mixing slab, the greater the danger of having the surface temperature below the dew point and thereby defeat its purpose by incorporating this moisture into the cement.

During the summer months the atmospheric conditions are often such as to cause a dew point with the temperature slab at 70 deg. F., or perhaps higher. At such times the operation should not be undertaken unless we have an air drying cabinet. This device is divided into two compartments. The lower part contains several dishes of calcium chlorid. The bottom of the upper compartment is perforated, which allows the circulation of air to accomplish the absorption of the moisture from the air in that space. I have with me a photograph of this cabinet, which will give a more definite idea of its construction, and those who are interested may see it before leaving the room.

As regards the mixing of silicate cements, I find that if the mix is made as rapidly as possible, we are more apt to get a correct proportion of liquid and powder. Select the various shades of powder to be used in a given case; place them on the mixing slab in separate mounds, then place the required amount of liquid in proper position to handle well, and with an agate spatula draw about one-half the amount of the powder to be used into it, using for this the shade nearest approximating the tooth to be filled, mix most thoroughly for about one-half minute, after which we may work into the mass small quantities of the powder of the various shades, thoroughly mixing each portion when drawn into the mass, until the desired consistency has been obtained. The various consistencies giving best results are carefully stated by the manufacturers, and we will do well to follow their instructions and not try to improve upon them.

The material should be carried to the cavity immediately, packed well into the undercuts, and molded to form, allowing a slight excess for finishing. The final molding must be done with an agate instrument of suitable shape or a thin celluloid strip slightly covered with cocoa butter. Wait fifteen or twenty minutes, then trim and finish, and slightly coat filling with wax, varnish or paraffin, then remove the rubber dam, dismiss the patient with instruction not to disturb the coating for several hours, and finish the filling at a subsequent sitting.

Great care is necessary in finishing this material. Use for this purpose polishing strips and disks of very fine grit, slightly covered with cocoa butter, and finish towards or parallel with the enamel margin. There is some danger of using this material in all classes of cavities, regardless of the fact that other materials would serve a better purpose in given instances.

Personally, I am not enthusiastic over the use of silicate cement, except in the following classes of cavity: Cavities in the gingival third of incisors, cuspids and bicuspid, and in the proximal surfaces of incisors, and cuspids which do not extend to the incisal angle. In complex cavities involving the labial and one or both proximal surfaces, not extending to the incisal angle, I find silicate cement indispensable. In some cases of proximal cavities, where the incisal edge is extensively involved, it may be used in combination with the gold inlay. This, however, is a more difficult operation than would

seem at first thought, for unless we get the amount of materials well proportioned at the incisal edge we are apt to be disappointed.

The preparation of a gingival third cavity, for the reception of silicate cement, should be much the same as for a porcelain inlay, except a slight undercut for retention being necessary. The enamel walls should be put at right angles with the surface of the tooth. It so happens that in this position the enamel rods are laid perpendicular to the tooth surface. Therefore, the beveling of the cavo-surface angles is not so essential as in other forms of cavities.

The preparation of cavities in the proximal surfaces of incisors and cuspids which do not extend to the incisal angle, differs from those prepared for gold in several respects. It is desirable to save all enamel that does not interfere with the proper cleansing of the cavity, and instead of opening the cavity from the lingual, the esthetic possibilities of this material justify opening of proximal cavities of incisors from the labial surfaces unless the position of the cavity should indicate otherwise.

Silicate cements seem to have none of the inhibitory or therapeutic properties possessed by the various other filling materials, and must, therefore, depend on some other agent used in conjunction when a therapeutic effect is thought necessary.

Extensive practical experience, however, leads me to believe that this limitation of therapeutic property is not a serious objection, having used silicate cement in my own practice in approximately 4,500 cavities, with most splendid results. True, there were some replacements, but what very few failures were noted out of this large number of fillings were invariably due to improper technique in some form or other, or bad judgment in selecting the indication for its use. This fact leads me to believe that we have today a translucent material which does not injure the pulp, is proof against discoloration, and the use of which is warranted beyond question in cavities such as I have mentioned, and from an esthetic standpoint, I may say there is nothing I have done for my patients that has elicited so keen an expression of appreciation as the restoration of their anterior teeth to their natural appearance with silicate cement.

REPORT OF THE COMMITTEE ON DENTAL SCIENCE
AND LITERATURE.*

BY GEORGE C. POUNDSTONE, D.D.S., CHICAGO.

The statement has been made that dental literature has not kept pace with that of medicine and some of the other allied professions, but this will surely not hold good during the past few years.

The rapid growth of the science and the wealth of literature that has been placed before us is sufficient, if it were all read and studied, to occupy the entire time of the dentist and leave him no opportunity for the practice of his profession.

As in the past, much of the literature of the last year is of a high character, some not so good and some very commonplace, but the general trend is upward and each year the number of high class articles in the dental journals is increasing.

I believe I am fully warranted in the assertion that more scientific research work has been done in the past year than in any similar period previously. Much of the credit for this commendable work is due to the efforts of the National Dental Association through its research commission.

Especial attention is called to the work on Dental Caries, by Dr. Russell W. Bunting and Dr. U. G. Rickert; to the Report on Mouth Infection by the research corps under the able direction of Dr. Thomas B. Hartzell and his assistants, Dr. Arthur T. Henrici and Dr. Harold J. Leonard; to the Special Researches in Physics by Dr. Weston A. Price on the behavior of wax and metals in the process of casting.

The research commission has undertaken a great work and from the excellence of that already done we may confidently expect great things as the work progresses. Dr. Price is to give a report of progress during this meeting.

Undoubtedly the most sensational scientific event of the year was the discovery of emetin as a cure for pyorrhea. A large amount of literature upon the subject has already been placed before the profession.

It is a little too early yet to pass judgment upon the method. It is hoped that it will do all that the enthusiasts claim for it.

*Read before the Illinois State Dental Society, May, 1915.

but even if it does not do all that it will undoubtedly be a valuable assistant in the hands of the dentist in the treatment of this dreaded and little understood disease.

Many excellent articles have been published during the past year relative to pyorrhea and its effects, among which should be mentioned:

Protozoa of the Mouth in Relation to Pyorrhea Alveolaris, by Dr. M. T. Barrett, of Philadelphia.

Pyorrhea Alveolaris as a Predisposing Cause of Cancer of the Alimentary Canal and Associated Parts, by Dr. F. St. J. Steadman, of London, England.

Some Observations upon the Use of Vaccine in the Treatment of Pyorrhea Alveolaris or Chronic Alveolar Osteomyelitis, by Dr. Alvin W. Viney, California.

Researches Upon the Endamoeba Buccalis, by Dr. Angelo Chiavaro, of Rome.

The Pathology and Etiology of Pyorrhea, by Dr. Percy R. Howe.

Rationale of the Use of Bacterial Vaccines in Pyorrhea Alveolaris, by Dr. A. Parker Hitchens.

The History of Emetin, by Dr. Hermann Prinz.

The subject of mouth infection as a source of systemic disease has been ably discussed by many men of both the dental and medical professions, which emphasizes the close relationship between the two professions. We are beginning to see the necessity and wisdom of the dentist and the physician working together to their mutual advantage as well as to the advantage of the patient.

Many articles have appeared in the journals, among which should be mentioned:

The Systemic Effects of Oral Sepsis, by Dr. A. M. Nodine.

Bacteria of the Mouth and Their Relation to Systemic Disease, by Dr. F. E. Stewart.

Surgical Lesions Due to Oral Sepsis, and Their Treatment, by Dr. W. J. Roe.

Oral Sepsis as a Cause of General Systemic Infection and the Dentist's Responsibility, by Dr. Andrew J. Sawyer.

Infections of the Mouth and Their Relation to Systemic Disease, by Dr. P. G. Puterbaugh.

Etiological Relation of Focal Infection to Remote Diseases, by Dr. Robert B. Preble.

Mouth Infection as a Source of Systemic Disease, by Dr. C. H. Mayo, Dr. E. C. Rosenow and Dr. Frank Billings.

In this connection attention should also be directed to an excellent contribution to our literature under the title, "What Every Dentist Should Know About Surgical Lesions of and in the Region of the Upper and Lower Jaws," by Dr. Joseph Colt Bloodgood, in which particular emphasis is placed upon the early recognition of precancerous lesions in the mouths of patients presenting for dental work, and "The Effect of Diet upon Conditions in the Oral Cavity, with Special Consideration of Scurvy," by Dr. Edward B. Rhinehart.

Scurvy is said to be not an uncommon disease. The importance of oral hygiene is constantly growing, if we may judge from the increasing amount of literature upon the subject, not only in the dental and medical journals, but in magazines and daily papers as well.

The care of the mouth and teeth has become a popular subject and newspapers today are ready and anxious to publish good articles, whereas but a few years ago the same articles could only have gotten into their columns at advertising rates. The newspapers and magazines are the great disseminators of knowledge and they are the only means of reaching millions of people. Too much attention has been paid to the writing of brilliant articles for dental societies to be published in dental journals and occasionally read by other dentists, while the great mass of people have still been kept in darkness, but the dawn of a new era is here and thanks to our public dental education committees some of the glad tidings are getting out where they belong through the public press.

The knowledge of emetin as a treatment for pyorrhea has made most rapid progress among the laity through the writings of Dr. Evans, Dr. Edwin F. Bowers and others that have appeared in the public press.

I am not so sure but what they have over enthused the public and may have caused the dentist some embarrassment in explaining his inability to make good all of their extravagant claims, but they have started more people to thinking about

their teeth than all the dentists in the state have done in a similar length of time.

Orthodontia comes in for a prominent place in the literature and each succeeding year sees a growing interest in this very important branch of dentistry. The trend seems to be towards the earlier work, the correcting of errors in early childhood thereby avoiding many of the abnormalities that are the result of a lack of attention at the proper time.

A few representative articles will indicate the progress being made and the general line of thought that is being given to the subject by the orthodontists.

Study of Normal Dental Arches and Normal Occlusion, by Dr. Bernhard W. Weinberger.

Diagnosis of Malocclusion of the Teeth, by Dr. Sheldon Friel, of Dublin.

Relation of Internal Secretory Organs to Malocclusion, Facial Deformity and Dental Disease, by Dr. Clarence J. Grieves, of Baltimore.

A Study of Some Etiological Factors of Malocclusion, by Dr. Milo Hellman.

Some Morphological Changes in Jaw Bones Produced by Orthodontia, by Dr. Milo Hellman.

The gold inlay and the gold foil filling have just about quit quarreling with each other and both have settled down to business.

Very few theoretical or technical articles upon either have appeared the past year, but there has been a large number of practical, helpful articles, specially upon the inlay and the methods of making it.

The following will serve to illustrate what the gold workers are doing:

The Indirect Method as It Applies to Cast Gold Inlays, a Technique Recognizing the Shrinkage of Wax and Gold, by Dr. L. C. Burgard.

The Restoration of Occlusal Surfaces of Molars and Bicuspid with Cast Gold Inlays, by Dr. R. Ottolengui.

Technique for some of the problems in Casting, by Dr. T. P. Hinman.

The Non-Cohesive Gold Filling, by Dr. A. W. Sweeney.

The Technique and Relative Value of Gold Fillings and Inlays, by Dr. J. V. Conzett.

The Filling of Teeth with Cast Gold Inlays, by Dr. R. Ottolengui.

The Gold Inlay, by Dr. J. V. Konzett.

The Gold Foil Filling, by Dr. Arthur D. Black.

Prosthetic dentistry is covered by a varied assortment of articles that touch upon almost every phase of the subject, as will be seen by the following:

Tube Teeth and Porcelain Rods, Uses and Adaptations in Prosthetic Dentistry, by Dr. John Girdwood of Edinburgh. A series of papers through the year in cosmos.

Full Upper Plate Retention, a Critical Study, by Dr. Chas. R. Turner.

Modern Crown and Bridge Construction, by Dr. Thos. P. Hinman.

Essentials of Anatomical Articulation, by Dr. W. C. Dalbey.

Utilization of Diatoric Teeth as Interchangeable Teeth for Bridges, by Dr. S. Satori.

Aluminum as a Base for Artificial Dentures, by Dr. Hart J. Goslee.

Method of Constructing a Porcelain Jacket Crown for Molar, by Dr. Edward B. Ducasse.

Temperamental Selection of Artificial Teeth a Fallacy, by Dr. J. Leon Williams.

Masticating Efficiency in Natural and Artificial Teeth, by Dr. Alfred Gysi. A series of articles in the *Digest*.

The porcelain inlay gets but slight consideration, but it is not dead, as is demonstrated by an excellent article entitled: "Notes on Porcelain with Special Reference to Retention," by Dr. J. J. Moffitt.

Amalgam is ably represented by a number of good articles by Dr. William E. Harper, Dr. Milton J. Waas, Dr. William W. Atkinson and others.

The silicates, while still a prominent factor in the restoration of tooth structure, have subsided from the abnormal boom they enjoyed a few years ago and are now used rationally in suitable cases to the greater satisfaction of both patient and dentist. Great improvements have been made both in material and methods of use until we can safely say that now they have established for themselves a permanent place among the filling materials.

The journals contain but few articles on the silicates, most of them dealing with the technique.

While many dentists are using the silicates conservatively, few seem to be ready to put their opinions into print, and those who do are far more conservative in their statements than were the writers of a few years ago.

An increase of interest seems to be developing in the subject of dental therapeutics. Especially is this noticeable in the number of excellent articles of scientific value that have appeared, some of which should be mentioned:

The Therapeutic Action of Potassium Sulfocyanate in Dental Caries, by Dr. Theo. Von Benst.

The Pathology of the Dental Pulp, by Dr. Russell W. Bunting.

Recognition of Diseases of Soft Tissue and of Foci of Infection About Roots, by Dr. J. P. Buckley.

Potassium Sulfocyanate, by Dr. Russell W. Bunting for the National Research Commission.

There have also been a number of articles on root canal treatment and filling by Dr. Elmer S. Best, Dr. J. T. Hall, Dr. Max M. Eble, and others.

Anesthesia and analgesia have occupied a very prominent place in the dentist's attention during the past year, and the articles written upon these subjects outnumber those of any other department of dentistry.

Like every other new thing that comes out, there is a season of extravagant claims, a great boom, then there is a collapse and finally a readjustment and things get into their proper places and fulfill their legitimate missions. Too often the boom has been created for the sole purpose of selling expensive apparatus and by the time the true worth of the process has been ascertained thousands of dentists who thought they wanted to be progressive and up-to-date find themselves loaded down with a lot of either worthless or at least impractical machinery.

Much of this has undoubtedly been done in this line and anesthesia and analgesia have been exploited to the limit for advertising purposes. Nevertheless, they have their true value and many of the excellent articles published, if read and followed by the dentist, will prove of inestimable value to him and a boon to suffering humanity.

We would especially call attention to the article "Nitrous Oxid Anesthesia in General Dental Practice," by Dr. E. B. Prentiss, in *Cosmos*, Feb., 1915, in which he has brought together the opinions of some of the best qualified men in the profession. Every dentist, whether he uses nitrous oxid or not, should read this article.

Anesthesia and Its Relation to Operative Dentistry, by Dr. W. D. De Long.

Novocain Suprorenin Anesthesia, by Dr. Richard H. Riethmüller.

Nitrous Oxid and Oxygen Anesthesia and Analgesia, by Dr. L. Schultz.

Local Anesthesia and Its Use in Dental and Oral Surgery, Including Cavity Preparation, by Dr. H. A. Potts.

Anesthesia and Shock, by Dr. C. F. B. Stowell.

are all articles worthy of attention and careful study by the dentist who uses anesthesia in any of its forms.

The business side of dentistry that has so long been kept in the background is at last beginning to occupy its true place, and dentists are commencing to discuss the business as well as the professional side of our calling. For years there has been a lack of consideration of business for fear that it might be unethical and that field has been left to the advertiser, the charlatan, and the quack, and our young men have entered the profession filled with high class theories and ideals without any practical knowledge of the ethical methods of converting them into money, the prime incentive for studying any profession, unless it be the ministry.

The young dentist, failing to get the financial reward he dreamed of or failing to properly conserve that which he does get, from lack of proper business training, looks around him and grasps at anything that seems to promise what he seeks, with failure as the result because he has no system. Big business is founded on system and big dentistry must be founded on system in all of its departments if it is to be successful.

Many articles have appeared the past year dealing with the business side of dentistry and I am confident that they have proven of inestimable value to the profession at large.

Radiology, especially as a means of diagnosis, extraction or exodontia, as insisted upon by Dr. Stowell; surgery, electro-therapy and jurisprudence have all received their fair share of representation in the literature.

The list of new books published is large and covers almost every field of dentistry. Some are entirely new, while others are new editions of older works. It was suggested by our president about two weeks ago that we have an exhibit of all the new books published, and your committee immediately saw the advantage to be derived from such an exhibit, but upon investigation found that it would, owing to the short time, be impossible to get together more than a small percentage of the meritorious works that have appeared during the past year, and with only a partial exhibit an injustice would be done to those publishers not represented.

Your committee therefore wishes to recommend that hereafter an exhibit of new books be a part of the report of the Committee on Science and Literature.

In lieu of providing you the opportunity of examining these new publications for yourselves, your committee has endeavored to select and classify a few of those that will perhaps be of most practical help in our daily practice.

More new books have been written upon the subjects of anesthesia and analgesia than upon any other subject of dentistry, and of these attention is called to the following:

Anesthetics, Their Uses and Administration, by Dudley Wilmot Buxton, M. D., B. S., M. R. C. P., 477 pages, \$3.00, published by P. Blakiston's Son, & Co, Philadelphia.

An excellent work in which the author makes a strong plea that the dentist should thoroughly master the subject of anesthesia and work upon scientific principles. He favors nitrous oxid or nitrous oxid and oxygen as the safest and perhaps the best for dental operations. The book contains valuable information on accidents and after effects of anesthesia and their treatment.

Local and Regional Anesthesia, Including Analgesia, by Carroll W. Allen, M. D., of Tulane University, New Orleans. 625 pages, 255 illustrations, \$6.00. Published by W. B. Saunders & Co., Philadelphia.

A well written work on the use of local anesthetics.

Local Anesthesia, Its Scientific Basis and Practical Use, by Professor Dr. Heinrich Braun. 399 pages, 215 illustrations, \$4.25. Published by Lea & Febiger, Philadelphia.

No man has done more to extend the use of local anesthesia than Professor Braun, and in this, his latest work upon the sub-

ject, he has demonstrated a still wider field of usefulness for the practice. Many difficult operations may be performed under local anesthesia by his methods, that have previously been considered impossible except under a general anesthetic.

Oral Anesthesia, by Kurt. Hermann Thoma, D. M. D. 142 pages, \$3.00. Published by Ritter & Flebbe, Boston.

A profusely illustrated work dealing especially with the technique of injection for local anesthesia.

Local Anesthesia in Dentistry With Special Reference to the Mucous and Conductive Methods, by Professor Dr. Guido Fischer. 244 pages, 115 engravings, \$4.00. Published by Lea & Febiger, Philadelphia.

This new edition is an excellent work upon the technique of local anesthesia. Novocain and suprarenin is the choice of local anesthetics and especial emphasis is placed upon asepsis being observed to the minutest detail.

The Principles and Practice of Tooth Extraction and Local Anesthesia of the Maxillae, by Wm. J. Lederer, D. D. S. 262 pages, \$3.00. Published by The Redman Co., New York.

A brief and extremely practical exposition of the subject in hand with all superfluities left out.

In operative dentistry the most important publication of the year is a new edition of

Principles and Practice of Operative Dentistry, by John Sayre Marshall, M. D., Sc. D. 698 pages, \$5.00. Published by J. B. Lippincott Co., Philadelphia and London.

The work has been carefully revised and a new chapter added on Electro-Therapeutics. The author cautions the indiscriminate use of analgesia.

The illustrations, of which there are over 700, are of the very highest quality and should commend the work to all dentists.

In prosthetic dentistry we have a new edition of

A Manual of Dental Prosthetics, by George H. Wilson, D. D. S. 531 pages, 386 illustrations, \$4.00. Published by Lea & Febiger, Philadelphia.

Prosthetic Articulation, by George Wood Clapp, D. D. S. 251 pages, illustrated. Published by the Dentists' Supply Co., New York.

A clear and concise exposition of the Greene-Supplee im-

pression method and the Gysi method of articulation with the Williams' tooth forms.

There are a number of new books on Pathology and Therapeutics, and of these attention is called especially to

A Text Book of Dental Pathology and Therapeutics. Based on the original of Henry W. Burchard, M. D., D. D. S. Rewritten by Otto E. Inglis, D. D. S. Fifth edition, 807 pages, 708 engravings, \$5.00. Lea & Febiger, Philadelphia and New York. 1915.

A thoroughly revised edition fully up to the present date.

Pathology and Bacteriology for Dental Students, by Guthrie McConnell, M. D. 309 pages, 108 illustrations, \$2.25. Published by W. B. Saunders Co., 1915, Philadelphia and London.

A book not only for students but for the general practitioner as well.

In this connection we wish to refer to an entirely new work on

Special Dental Pathology Devoted to the Diseases and Treatment of the Investing Tissues of the Teeth and the Dental Pulp, by G. V. Black, M. D., D. D. S., Sc. D., L. L. D. 489 pages, 518 illustrations, \$6.00. Published by The Medico Dental Publishing Co., Chicago.

This, the latest of Dr. Black's works to be placed before the dental profession, will be of inestimable value not only on account of the pre-eminent position of the author but because of the wide and practical scope of the work itself. Dr. Black has always in the past laid particular stress upon the peridental tissues and their diseases, and in this work he has entered more into the pathology and treatment of these diseases in such a way that their management may now be undertaken with practical assurance of success by the general practitioner.

The work also treats of the dental pulp, including the sequelae of pulp death, acute and chronic alveolar abscess necrosis, etc. There are also chapters on oral prophylaxis, mouth hygiene and systematic effects of mouth infections, making it the most complete work of its kind.

The illustrations, a prominent feature in all of Dr. Black's publications, are in this book superior to anything that has ever been published, especially those in connection with the chapter on mouth hygiene.

The book is well printed on good paper and will be a prized possession of every dentist fortunate enough to possess one.

On the subject of Orthodontia several books have appeared during the year, among which are:

Essentials of Orthodontia, With Special Reference to Nomenclature, Including an Outlined Course in Practical Technics for Students, by Van Broadus Dalton, D. D. S. 103 pages, 167 illustrations, \$1.25. Published by P. Blakiston's Sons & Co.

Practical Orthodontia, by Martin Dewey, D. D. S., M. D. 342 pages, 248 illustrations. Published by C. V. Mosby Co., St. Louis.

Oral hygiene is well represented by

Practical Oral Hygiene, Prophylaxis and Pyorrhea Alveolaris, by Robin Adair, B. S., M. D., D. D. S. 327 pages. Published by Byrd Publishing Co., Atlanta.

An extremely interesting book filled from cover to cover with valuable information on this most important subject.

Two books on Dental Jurisprudence have come out within the year, one entitled

Dental Jurisprudence, an Epitome of the Law of Dentistry and Dental Surgery, by Elmer D. Brothers, B. S., L. L. B. 220 pages, \$2.00. Published by C. V. Mosby Co., St. Louis; and

Ethics and Jurisprudence for Dentists, by Dr. Edmund Noyes, D. D. S. A splendidly arranged and well written book of 247 pages, every one of which is worthy of the dentist's careful reading and serious thought. Some dentists are not professional men because they have never comprehended the difference between a profession and a trade. A careful study of Dr. Noyes' book will certainly make clear this difference and pave the way for the tradesman to become a true professional man.

The most extensive work of the year is

The Science and Practice of Dental Surgery. Edited by Norman G. Bennett, M. A., M. B., B. C., L. D. S. With an appendix on Dental Jurisprudence by P. B. Henderson, B. A. 786 pages, 993 illustrations, \$9.00.

This work is a compilation of the work of about thirty of the most eminent dentists of Great Britain, Canada and New Zealand, embracing every subject that can in any way have a bearing upon dentistry.

There are books on Radiology, Histology, Organography, Bac-

teriology, Anatomy, Physiology, Surgery, Chemistry, Quiz Compendis, State Board Questions and even one volume of poems compiled and published by a dentist, but this report is already too long and I trust that you may not again be burdened by such a report but that you may have the opportunity of examining the books for yourselves, thereby gaining a better understanding of the work than the most elaborate report can give.

REPORT OF THE COMMITTEE ON DENTAL ART AND INVENTION.*

BY DR. GEO. E. MEYER, CHICAGO, ILL.

To the Members of the Illinois State Dental Society :

Owing to the long program of last year's meeting—our 50th anniversary—and to the unusually large exhibits by the dental supply houses, this committee made no report at that time. This year, therefore, I have the pleasure of presenting to you a short resume of the progress in dental invention during the past two years.

The various dental manufacturing concerns have kindly supplied the committee with lists and samples of their new appliances and supplies. For the sake of brevity, merely the names of the companies, together with the more important articles offered by each, will be read here.

Toledo Technical Appliance Co., Toledo, Ohio.

Automatic surgical, automatic dental, and non-automatic appliances for analgesia and anesthesia.

Harry J. Bosworth, Chicago, Ill.

- (1) Bunsen Burner. Attaches direct to any gas pipe and can be brought out close to chair for convenience and can be put back out of the way. Has an extension of 30 inches from wall—as many 9-inch sections can be added as wanted. No rubber tubing necessary and consequently no bad gas odors in the operating room.
- (2) Meyers Dental Light. This light burns a 250-Watt Tungsten which burns about 2 cents per hour to operate

*Read before the Illinois State Dental Society, May, 1915.

and gives a perfect light for operations in the mouth and lights up the entire operating room. It can also be used with a 200-Watt nitrogen lamp. It is not hard on eyes to look at and is decorative compared with other lights heretofore used.

- (3) Bosworth Prophylactic Table. This table is designed especially for the man doing Pyorrhea and Prophylactic work. It can be used on the wall bracket in place of the regular bracket table or from an operating stand or aseptic stand found in most offices. There is a place for everything in this work.

The American Cabinet Co., Two Rivers, Wis.

- (1) Aseptic Operating Table. Fully as convenient as the ordinary bracket and table and will relieve the window casing or wall of one of its burdens.
- (2) Sectional Bench, by Bosworth. With this unit arrangement one can fill any space required, whether that space is against a straight wall or around a corner.

Eli Lilly & Co., Indianapolis, Ind.

- (1) J. P. Buckley's Desensitizing Paste. A new remedy for hypersensitive dentin.
- (2) Alvorea Emetin by absorption. A local treatment of Pyorrhea Alveolaris.
- (3) Emetin Hydrochlorid preparations for dental use.
- (4) Alcresta Ipecac. Alkaloids of Ipecac for oral administration in treatment of Pyorrhea.
- (5) Boremetine. For the local treatment of Pyorrhea Alveolaris.

Consolidated Dental Manufacturing Co., Chicago, Ill.

- (1) The new Offset Davis Crown Pin. For such roots where a straight pin does not permit natural alignment of the crown with the root.
- (2) Em-Pyr Syringe. For the administration of Emetinis Hydrochlorid for Pyorrhea treatment, approved by Dr. Allen Smith and M. T. Barrett of the Pathological Laboratories of the University of Pennsylvania.
- (3) The Davis Crown Root Set. With the 1-2-3 blade Davis Crown Reamer, the root canal is opened to correspond exactly with the size of the Davis Crown Pin to be in-

served into it. The minimum of tooth structure is removed and the pin fits perfectly its entire length without depending upon a stuffing of cement.

- (4) The Davis Crown Root Set. No. 4 Counter Sinking Root Facer is used to sink the root, preparing a slight depression to correspond with the shoulder of the Davis Pin. This permits embedding the pin shoulder partly in the crown and partly in the root.
- (5) The Davis Crown Root Set. No. 4 Counter Bore Reamer is used when casting to the Davis Pin. By reaming out the base of the pin socket, it is possible to reinforce the pin in casting, making a stronger joint.
- (6) Novo Imperial Dental Syringe. For the administration of Novocain according to the Fischer Method.
- (7) Record Syringe. For conductive anesthesia.
- (8) Frahms Carving Instruments. For wax and amalgam.
- (9) Williams' Amalgam Mixer.
- (10) Casting Machines and Analgesia Outfit.

Professor Dr. Guido Fischer's Conductive Anesthesia Outfit:

1. Fischer Syringe.
2. Iridio Platinum Needles.
3. Novocain Dissolver.
4. Ringer Solution Dissolver.
5. Syringe Sterilizing Jar.
6. E Novocain.
7. Ringer Tablets.

Crescent Dental Manufacturing Co., Chicago, Ill.

- (1) Combination Swaging Stool Anvil.
- (2) Inlay Holder. This will hold an inlay or any small object that you may have occasion to hold while grinding or polishing, regardless of irregularity.
- (3) Root Reamer. Nothing but the cutting edge comes in contact with the root that is being reamed, thereby eliminating the heat generated by the old style relieved reamer.

The Sanitor Company, Chicago, Ill.

Vacuum Treatment in Pyorrhea. Controls the Alveolar process against absorption, prevents infection, and revitalizes the tissues.

The Ritter Dental Manufacturing Co., Rochester, N. Y.

- (1) Chuck Lathe. So constructed that 3 different sizes and grits stones are mounted on one single chuck, affording a time saving convenience for prosthetic workers.
- (2) The Ideal Columbia Chair (with improved platform). The basic principles of its construction remain the same; a new platform supplants the foot-roll previously used, which overcomes the objection of an opening for the foot to slip through.
- (3) The Columbia Model "C" Engine. The compact folding-bracket and swivelled-motor permit the use of this engine in confined quarters, and the arms of bracket when folded being raised at a good height from the floor removes interference with radiators or other equipment.
- (4) The Columbia Air Compressor Unit. Designed for use with any type of switchboard, or can be used for atomizer purposes or in the laboratory without a switchboard connection.

Julius Aderer, Inc., New York.

Lingual Bar Bender. Will bend oval wire as well as flat or half round wire effectively to the required shape without leaving any marks.

J. F. Jelenko & Co., New York.

Ready-Made Lingual Bars. Cased (not plated) with 18-kt. gold (1-10 gold) equal to 30 gauge. The centre is of high-fusing metal, and the casing is heavy enough to obviate all fear of wearing off.

The J. Austin Dunn Specialty Co., Chicago, Ill.

Dunn's Emetin Syringe. An Iridio-Platinum Needle only twenty-seven thousandths of an inch in diameter, stiff and rigid, permits the injection of Emetin or like solution at the bottom of pyorrhea pockets with minimum effort and irritation. All parts are easily separated for sterilizing.

J. W. Ivory, Manufacturer, Philadelphia, Pa.

Root Canal Picks. Abrasive Cutter, Nos. 1 and 2, for replacing broken facings. For opening and enlarging root canals clear to the apex without danger of piercing the side of the root.

Cleveland Dental Manufacturing Co., Cleveland, Ohio.

- (1) Mortar and Pestle. Crandall's Wedgewood. Pestle large size and shaped to fit mortar. Extra long handles affording a better grip.
- (2) Pliers. Prime patterns. A, B, C, D. Four sizes of one general shape suitable for cusp work.
- (3) Elevators. "Exact Pattern," giving grip nearer the beaks and shaped with large size handle, well balanced.
- (4) Cutting instruments. One set of 35 as selected by Drs. Woodbury and Crandall. Necks are shorter and handles longer than regular styles, affording a very much firmer (finger) grasp with increased leverage and control.

C. L. Frame Dental Supply Co., Chicago, Ill.

Mortar and Pestle, "Harper" Pattern. Long handle pestle allowing proper grip for the thorough trituration of amalgam.

Buffalo Dental Manufacturing Co., Buffalo, N. Y.

Broach Holders. No. 690 and 691. Suitable for posterior work. Has hole through the entire length, enabling the insertion of the broach to any desired length.

The L. D. Caulk Co., Milford, Delaware.

Impression Trays. Sanitary. Made of composition celluloid with removable handle. Can be bent to any shape in hot water and trimmed with shears. Three sizes Lowers, three sizes Uppers.

Columbus Dental Manufacturing Co.

Rugapaks. A scientifically worked out pattern of Rugae stamped in tin foil saves the labor of Rugae carving.

Scott Manufacturing Co.

Swager Cusp. A set of seven dies with eccentric swager. Dies are universal for molars and cuspids, fitting all sizes and shapes. Work can be done at chair. Band is fitted and contoured, cusp is articulated in the mouth. Solder line is on the cusp, and contact point below solder.

Randall, Faichney Company, Boston, Mass.

Syringe. Novo Imperial. For use in conductive anesthesia.

Plunger ground to fit. Barrell eliminating washers.

Detroit Dental Manufacturing Co., Detroit, Mich.

Impression Trays. Removable handle, Dr. Greene's pattern.

Composition metal rigid but can be bent to any form. Four sizes Lower, two sizes partial. Allows trimming for muscles.

A. C. Clark & Co., Chicago, Ill.

Automatic Gas Attachment.

New indestructible cuspidor, noiseless.

E. S. Hodgson, D. D. S., East St. Louis, Ill.

"The Acme Stone Truer." For truing and shaping carborundum stones. Constructed to receive the mounted stone and mandrel in such a manner as to allow them to revolve freely. When held at the proper angle against a rapidly revolving lathe wheel, the mounted stone is turned perfectly true.

"The Acme Stone Moistener." Instantly adjusted to any hand piece. It eliminates all friction and disagreeable odors of tooth dust and hot carborundum and insures a clean, sharp stone.

The S. S. White Dental Manufacturing Co., Chicago, Ill.

- (1) Plate Burnishers, Nos. 10 and 11. Designed by Dr. A. DeWitt Gritman, for use in connection with vulcanite and celluloid work. These will be known as No. 10 and No. 11. After a trial plate has been completed in wax and is ready for flasking, both the palatal and buccal surfaces of the wax trial plate are covered with tin foil against which the rubber is to be vulcanized.
- (2) Dr. J. Lowe Young's Wire Bending Pliers. For bending metal Arch Sections of Angle's Regulating Appliances. Operation is explained in the "Items of Interest" for November, 1913, page 821.
- (3) Post Extractor. Obtains a secure hold without cutting the root, then applies that powerful lever, the screw, to lift the post out of its bed.
- (4) Aseptic Tongue Scraper, No. 3. All metal. No. 3 is in general like Tongue Scraper No. 2, with the added improvement that the handle being all metal, the instrument can be easily sterilized by boiling or by immersion in any desirable antiseptic.
- (3) Carborundum Points, Nos. 21, 27, 28, 29, 30, 31. A line of desirable points for the preparation of cavities for

inlay work; some of them are excellent also for roughening backs of gold or porcelain inlays for cement retention, for preparing the surfaces of porcelain teeth for taking mineral stains, and in making jacket-crowns out of Detached-Post Crowns.

- (6) Anatomical Crown Articulator, No. 11. Has a lateral movement in addition to the single hinge movement as in Crown Articulator Nos. 5, 8, and 9.
- (7) Smooth Broaches. Put up in packages of six, one size only. For the introduction of dressings or medicaments into root canals.
- (8) Revolving Bur Stand. Given free of charge to dentists with an order for one gross Revelation Burs.
- (9) Mold Guide—Facing.
- (10) Mold Guide—Vulcanite Teeth. Mold number is stamped on the face of each tooth. Each set provided with Shade Directory and Detachable Tooth Shade Guide.
- (11) Cleansing Powder.
- (12) Pliers, No. 140. Designed by Dr. J. H. Prothero, for contouring "clasp" metal.
- (13) Orangewood Points, No. 3. Spoon-shape, intended primarily for polishing between teeth, its concavity lending itself readily to this work.
- (14) Casting Outfit. For small casting work of modern practice.
- (15) Mortar and Pestle, No. 5. Mortar in all respects like No. 2 and the pestle about $4\frac{3}{8}$ inches long and heavy in proportion. Enables one to get a firmer grip and to exert more pressure on the amalgam than has been possible with the pestle which is part of the No. 2 combination.
- (16) Various Office Equipment Combinations.
- (17) Nitrous Oxid and Oxygen Apparatus, No. 3. Gives operator three methods of inducing non-asphyxial anesthesia, has separate control, uniformity of flow, and a thorough mixing of the gases.

March, 1914.

- (1) Short Neck Revelation Burs. Gives greater convenience in opening cavities on the buccal surfaces of molars.

- (2) Smooth Linen Polishing Strips. Their thinness permits them to be worked up under the gum margin, while their width prevents their wearing a groove in the soft amalgam.
- (3) Separator Wrench, No. 6. Overcomes difficulties found in placing Perry and General Separators with the old means.
- (4) Agate Burnisher, No. 14.
- (5) Borated Violet Talcum Powder. Contains no bismuth or zinc.
- (6) Saliva Ejector Mouth-Piece "E." Keeps the tissues out; lets the saliva in. Made only in flint glass.
- (7) Sterilizable Cone-Socket Handles. Octagonal shaped, made of steel, comparatively smooth and nickel-plated.
- (8) Solder Tweezers "O." Solder tweezers "O" are a modification of the "L" tweezers, having long but straight beaks.
- (9) Solder Tweezers "P." Similar to Tweezers "K," except that the beaks are bent almost at right angles. Especially adapted for holding teeth regulation bands while soldering.
- (10) Crown Shears No. 3. Do not curl up the plate in crown work, the backs of the blades being bevelled. They are not recommended for cutting heavy plate.
- (11) Plaster Knife, No. 10. Blade is made of tool steel, hollow ground, round handle, which enables the operator to work effectively and practically without tiring him.
- (12) Pliers, No. 139. Designed by Dr. Edward H. Angle.
- (13) Spring-Plunger Syringe, No. 39. Instantaneous filling. Except the plunger packing, the entire appliance is of polished metal.
- (14) Hypodermic Needles. Have a universal thread which will fit almost any of the standard syringes. Made with hexagon hubs in both straight and curved points.
- (15) Agate Spatula, No. 33. Double ended, all agate, working surfaces rounded to almost knife edges, one end pointed, and the other rounded.
- (16) Harvard Bone Spatulas. Especially adapted for mixing Harvard Cement and Harvard Translucent Enamel.

- (17) Upper Impression Trays, Nos. 24 and 24½. Smaller and therefore better adapted for use in connection with deciduous cases or wherever a smaller tray may be desired.
- (18) Lower Impression Trays, Nos. 28 and 29.
- (19) Lower Impression Tray, No. 30. For use in cases where six or more anteriors are left standing.
- (20) Prinz's Root Canal Filling (Points). It fills the canal full with a solid, unchangeable, inert substance which is impermeable, water-tight, non-putrescent, non-irritating, and which will not be absorbed by the tissues.
- (21) Mechanical Saw Frame. Improved. Improvements apply especially to the threaded parts which are better cut and hardened so that they will not be easily stripped.
- (22) Office Preparation, Bottle No. 7. A new size of the ground glass cover bottle, made in flint, blue, and amber glass. Capacity, one ounce.
- (23) Dr. C. V. Black's "1, 2, 3" Mixture. Oil of Cassia, Phenol Crystals, Oil of Wintergreen, respectively. Used in root canals after pulp removal, and as a sedative in pulp exposure accompanied by inflammation.
- (24) Rubber Dam Clamps, Nos. 140 to 142. Designed by Dr. G. V. Black, to be used in placing rubber dam over the roots when placing treatment in canals.
- (25) The Everyday Appointment Book. Appointment space for every half hour from 8:30 a. m. to 7:00 p. m., weeks of seven days.
- (26) Brush Wheels, Nos. 91 and 92. Same shapes as Nos. 27 and 29, but made with extra stiff bristles.
- (27) Brush Wheels, Nos. 93 and 94. Same as Nos. 65 and 66, but made with extra stiff bristles.
- (28) Hale's Matrix Pluggers, Nos. 1 to 8 (C. S.). Enable the operator to solidify the matrix side of the gold without risk of powdering the enamel margin. Applicable to foil or fibre gold.
- (29) Knife-Edge File, No. 6. Especially adapted for the purpose of cutting a notch on the Middle Arch Section of Angle's Regulating Appliances.

- (30) Applicator for Paraffin Root Filling. Used to dry root canal and also to insert paraffin.

In conclusion, the committee hopes that the members will avail themselves of the opportunity to examine at close range the collection on exhibition during the two days of the clinic.

REPORT OF COMMITTEE ON NECROLOGY.*

BY DR. J. G. REID, CHAIRMAN, CHICAGO.

Peoria, Ill., May 11th, 1915.

To the President and Members of the Illinois State Dental Society:—

Your Committee on Necrology begs to submit the following report:

The vigorous and relentless hand of the Death Angel has most unexpectedly touched a few homes and members of this Society during the past year, and it now becomes one of the most pleasing privileges of your Committee to take notice and make a brief record of the lives that have passed to the beyond.

HONORARY MEMBERS.

Charles Richard Butler, D. D. S., M. D., died at Cleveland, Ohio, on December 15th, 1914, in the eighty-third year of his age. The disease which sapped his life was neuralgia of the heart.

Your reader now recalls with much satisfaction an incident which occurred at a banquet given by Lambda Chapter of Delta Sigma Delta at Cleveland something like twenty years ago. I chanced to be a participant upon that occasion. Prior to this my personal acquaintance with the deceased was somewhat limited, but at this time and place I found the priority of occasional greetings suddenly ripen into indissoluble friendship, and it came about in the following manner: When comfortably seated at the banquet table, I turned to him and said, how are you "Charlie?" Quick as a flash he responded by saying—"Jimmie, if you ever call me by any other name than 'Charlie' I will never recognize you again." His manner and voice clearly indicated to me that

*Read before the Illinois State Dental Society, May, 1915.

he meant what he said. Further conversation elicited the fact that his interest and love was centered in the growth of the on-coming professional young men seated at the table. He was a Father to every young man.

The passing of Dr. Butler certainly deprives dentistry of one more pioneer who ardently labored throughout his professional life to advance the profession to a higher plane. He was overwhelmingly interested in the practical things of dentistry which is fully evidenced in his contribution of many instruments, such as pluggers, excavators, chisels, etc., the patterns of which were wholly original.

He had not only a national, but an international reputation as a skillful operator and stood in a class with a score or more Pioneers who have already preceded him to the grave.

The following brief excerpt taken from the Dental Cosmos, informs us that he was born in "Portage County, Ohio, June 28th, 1832. His early life was spent on a farm and later he became a brass and bell founder. When quite young he began the study of dentistry and medicine as a student of Dr. M. L. Wright of Cleveland. After three years of pupilage and practice, he was fortunate in being taken up by that enthusiastic and incomparable teacher, Dr. W. H. Atkinson, who fathered him as a student, assistant and partner. In 1858 he was graduated from the Pennsylvania College of Dental Surgery, and in 1863 was graduated from the Cleveland Medical College.

Dr. Butler was one of the charter members of the Ohio State Dental Society, which was organized in 1866, and was next to the last of the charter members to pass away. He was president of the Ohio State Dental Society in 1875; president of the American Dental Association in 1888. He served on the Ohio State Board of Dental Examiners from 1874 until 1892.

If my examination of the records of this Society is correct, we find that Dr. Butler became affiliated with this body as an honorary member in the year 1874. It has been my pleasure as well as that of many other members of this Society to meet and greet him at many of the important functions of our profession.

Not all has been said, that might well be said of this man. Our primary purpose is to pay special tribute to the memory of one—and well on to the last of our fast fading pioneers of American Dentistry.

ROSS ALLEN PRITCHETT, D. D. S.

Ross Allen Pritchett died at his home, White Hall, Illinois, Wednesday, July 6th, 1914. "Deceased was the son of Dr. and Mrs. T. W. Pritchett and was born in White Hall, February 22d, 1876—his age at death being thirty-eight years, four months and sixteen days. On September 24th, 1902, he and Miss Laura Pearce were married, and she and one son, Edmund, aged five years, also one brother, Charles Pritchett, survive," It will be remembered his father and mother died January, 1913, within eight days of each other.

Ross graduated from the White Hall high school with the class of 1894. He then took a classical course in Austin College at Effingham, Illinois, and later entered the Dental School of Northwestern University, Chicago, from which he graduated in 1900.

Out of a class of two hundred graduates from the dental school, he was one of the six demonstrators chosen, but did not qualify, much preferring to enter the practice of his profession at once, which he did with his father in White Hall, both occupying office quarters together. He continued the active practice of dentistry until 1911, when ill health compelled him to discontinue the same. Thereupon he in company with his father decided to spend some time in the west—hoping that a change of climate would be of special benefit in the regaining of health. After several months trial the venture proved unsatisfactory and they returned without any perceptible improvement.

Immediately upon his return from the west, Ross decided that something in the nature of outdoor activity was necessary and at once "began a preparation to engage in the raising of fancy poultry. With characteristic exactness and systematic endeavor he evolved plans for establishing the best poultry-raising plant in his home county." Within the short period of one year his progress in this industry was so rapid that his stock took first premiums wherever exhibited.

While his health was showing little or no gain, he continued plans for extending his poultry-yard facilities and this was carried on until a few weeks before his death.

Ross was active in various lines. He was of a scientific turn and since August, 1908, has been serving as co-operative observer

of the U. S. weather bureau at White Hall. It is said of him that his work in this capacity has been invaluable, and has received warm commendation from weather bureau officials for accuracy and elaborateness.

In my personal visit at his home I found an extensive reference and research library which is ample evidence of scholarly attainments. His genius for building and improving was carried to a high degree in his home—every apartment, from cellar to garret, being maintained in the most sanitary and attractive style and condition. He was a model husband and father, a conscientious Christian gentleman.

I cannot overlook mentioning the one hour entertainment he gave me in discoursing sweet music upon the violin. A very renowned violinist paid him the compliment of being one of the most promising violinists within his acquaintance. He had a most thorough knowledge of Masonry, and his remains were conducted to the grave under the auspices of the local lodge of Masons.

Dr. Pritchett was a member of the National Geographical Society, the Illinois State and the Madison County District Dental Societies. He appeared on the program of the meetings of these dental societies on various occasions, always with credit to himself and with honor to the profession.

A most conspicuous and impressive thought brought to our attention in relating the foregoing facts, is the example of what can be accomplished in a few short years. I am indebted to the White Hall Republican for much of the matter contained in this notice.

ALBERT BARNES CLARK, D. D. S.

Dr. A. B. Clark, a life member of this Society, was born in Wailuku, Maui, H. I., July 19th, 1845; died in Hilo hospital June 30th, 1914—later the remains were shipped to his home, Honolulu, for interment.

He moved with his parents to Honolulu at the age of three years, where he attended the Royal School, afterward enrolling as a student at Punahou, which college he attended until eighteen years old; at this age he left the Islands with his parents, on a sailing vessel bound for California. In 1869 he left for Boston where he visited his parents during the summer, and in the

fall left the New England States for Chicago where he began the study of dentistry under Dr. A. W. Freeman, as tutor.

With an equipment of about eighteen months of dental instruction, from a practical standpoint, he decided to venture out for himself and opened an office at Turner Junction, about thirty miles from Chicago. While living there he became engaged to Miss Sarah Hamlin and shortly after this event he went back to Chicago to be a partner of Dr. Freeman. After a year and a half with Dr. Freeman, he opened an office for himself in December, 1872, on Madison St., Chicago, and in the same month of the same year, married Miss Hamlin.

Dr. Clark joined the Illinois State Society in 1876 at Galesburg, and also the Chicago Dental Society the same year. He was a deacon and elder of the Third Presbyterian Church of Chicago for many years.

He practiced dentistry for thirty years in Chicago and was honored with the presidency of the Chicago Dental Society. In 1902 he discontinued the practice of dentistry in Chicago—returning to Honolulu, accompanied by his family. Soon after the arrival upon the scenes of his boyhood, he again opened an office and continued active practice up to the year 1914; in the meantime he was instrumental in organizing the Honolulu Dental Society, being its president for a year.

Dr. Clark was very well known to many of us—especially in Chicago, where we found him to be a most affable and courteous man. He was exceptionally modest and very unassuming in his personality; rarely taking any part in a debate or discussion upon a dental subject before a dental society. He was uniformly a very regular attendant at society meetings, and invariably could be depended upon in furthering interest requiring financial aid. He received his dental degree from the Illinois School of Dentistry in 1899.

I am indebted to the Pacific Commercial Advertiser, published in Honolulu, for some of the facts appearing in the foregoing notice.

W. C. CHAPMAN, D. D. S.

William C. Chapman was born in Metamora, Illinois, May 3rd, 1871; died at his home in Gibson City, Illinois, Sunday December 13th, 1914, aged 43 years, seven months and ten days.

Cerebral hemorrhage being the cause of his death.

While he was yet a small child the family moved to Saybrook, Illinois, at which place he grew to manhood, and was educated there. Also commenced the study of dentistry in the office of Dr. J. M. Crigler, as a preparatory measure for entering a dental college. The dental degree was conferred upon him in March, 1891, by the Vanderbilt University of Nashville, Tenn. Dr. Chapman located in Gibson City, Illinois, April, 1891, and continued the active practice of his profession up to the time of the illness from which he never recovered.

With characteristic fidelity and close application to business he was rewarded by a fine practice. He was a man interested in the civic, social and religious activities of his home city—taking special interest in religious affairs; he said, "I have always loved the old Methodist Church and my highest ambition is to live a consistent Christian life." His splendid demeanor towards his professional neighbors won him friendships of inestimable value.

Dr. Chapman was a member of the McLean County Dental Society. He was elected to membership in that organization in 1902—and has always taken an active interest in its welfare. At the time he was stricken with illness, he was engaged in making arrangements for a meeting of the McLean County Society in Gibson City. The surviving family consists of a wife and three daughters who are left to mourn his loss.

CHARLES HENRY TILLOTSON, D. D. S.

Charles Henry Tillotson was born in Mattoon, Illinois, January 8th, 1869; and died in Mattoon, Illinois, April 28th, 1914.

He was graduated from the Mattoon high school in 1888. He studied dentistry in the office of Dr. S. A. Campbell, Mattoon, Ill., who tutored him during the years 1888-9, and thereupon matriculated as a student in the Dental Department, University of Pennsylvania, from which institution he received his dental degree in 1891. Thereafter for about eight years he was associated with Dr. Campbell in the practice of dentistry. In 1898 he opened an office for himself at Mattoon, and continued in a successful practice up to within a few months of his death.

Dr. Tillotson was married to Miss Czarina Clark, December 7th, 1898, and to this union two daughters were born; both of

whom died in infancy. Dr. Campbell speaks of him as follows: "His genial and happy disposition made him a favorite with all who knew him, and in his early preliminary training in dentistry he was ever obedient and industrious, and never an unkind word or act passed between him and his preceptor—a happy thought to dwell upon."

Dr. Tillotson joined the Eastern Illinois Dental Society at its first meeting, which was held in Paris, Illinois, in 1895; he served as president of this society during the year 1908. I herewith incorporate an excerpt of a set of resolutions passed by the above named society as an expression of esteem and regret at his untimely demise.

"To those who compute the span of life in days and years, his life may seem unfinished and his death untimely, but to him who measures life in heart throbs and who gauges its fullness by depth, not length of living, the life work of Charles Henry Tillotson was a volume complete, and the memory of his virtues will live on as an inspiration to all who came within the radius of his influence."

The thought expressed in this resolution can be most appropriately applied to the memories of all who fall within the scope of this report.

I am indebted to Dr. S. A. Campbell and the secretary of the Eastern Illinois Dental Society for the foregoing data.

WILLIAM JAMES M'INTYRE, D. D. S.

William James McIntyre was born at Watseka, Illinois, June 22nd, 1872, and died in the Woodman Sanatorium, Woodman, Colorado, on Saturday, January 2nd, 1915; aged 42 years, six months and ten days. Tuberculosis being the cause of his untimely death. His boyhood days were spent in Mt. Vernon, Ohio, going from there to Gibson City, Illinois, in 1888, whereat he became engaged in a commercial pursuit which occupied his attention up to 1905.

He matriculated as a dental student in the Chicago College of Dental Surgery in the fall of 1905; receiving his dental degree from that college with the class of 1908. Immediately after graduating, he established an office at Oak Park, Illinois, and continued the practice of dentistry, with success, until his affliction forced him to retire.

Dr. McIntyre was married to Miss Alice Gertrude Clark, February 9th, 1897, at Gibson City. This most happy union was blessed with five children—two boys and three girls—all of whom survive to mourn his loss.

Dr. McIntyre was possessed of high professional attainments, living an ethical life. His wife and children were his Heaven, and his highest ambition was to see them have the advantages of a suitable religious training, a good education, and a comfortable happy home. He was admitted to membership in the Chicago Dental Society in 1914.

In conclusion your committee desires to pause and give fresh thought touching on the uncertainty of life. We must think that a recitation of the good examples and character of men coming within the scope of this report will remind us that in the race of life, there can be friendship, there can be good fellowship, there can be charity and many little never-forgotten acts of kindness, all of which combined goes far towards rounding out a contented, happy, and hopeful prospect for the hereafter.

The officers and members of this society and the committee join in extending the full complement of sympathy to the bereaved families and friends of the foregoing deceased members.

All of which is respectfully submitted.

LOCAL ANESTHESIA.*

BY DR. EWING P. BRADY, ST. LOUIS, MO.

Local anesthesia may be defined as the art of producing temporary insensibility to pain in a localized area by the use of certain drugs or agents, which by an inherent property peculiar to themselves bring about an inhibition of the sensory nerves, in their power to convey painful impressions.

Pain.—The phenomenon of pain should receive some consideration in the study of local anesthesia. Without a doubt this subject is much more complex than would seem at first sight. Pain is a universal symptom of disease, and yet it is least under-

*Read before the St. Louis Dental Society, May 4, 1915.

stood and there is no entirely satisfactory explanation of its nature or mode of action.

The sensory nerves have their sensory organs at their peripheral termination. There are several kinds—touch corpuscles, end bulbs, touch cells and free nerve endings, most of which are distributed to the peripheral tissues; cutaneous, nervous, etc.

As has been said, the sensory nerves have their sensory organs at their peripheral terminations, and it is the brain that feels, but the brain is absolutely devoid of painful sensations. The exposed brain of a thoroughly conscious patient may be operated upon without any sensation whatever of pain. Stimulation of various parts of the brain may give rise to other sensation, but never pain.

The nerves themselves have very little sensation, but refer any stimulation or irritation applied to them to their peripheral distribution.

Pain may be described as a special sense of the afferent nerves or an exaggeration of common sensation, that is, a quantitative increase of sensibility. A particular center in the brain for painful impressions has never been found, although a great deal of work has been done on this subject.

From a physiological point of view pain may be said to be a reaction of the organism to harmful influences.

The state of the mind has much to do with the activity of our senses. This fact should be borne in mind in treating children and highly nervous individuals who are unable to exercise any self control and suffer much mental torture when about to undergo some trivial operation because all their senses are keenly alert in dreadful anticipation of the impending procedure which is magnified greatly in their mind. The sensation of tactility is magnified in their minds to that of pain.

Nerve function or force may be compared to electricity. Any alteration in conductivity or resistance may produce abnormal sensations, a diminution or interception of the vibrations will produce anesthesia. This vibratory theory: that nerves are in a constant state of vibration, an altered condition of this state affecting the conductivity or resistance may make itself known to our consciousness by various sensations. According to this theory it may be readily seen why nervous or neurotic patients with very active and impressionable nervous systems bear pain so poorly and phleg-

matic individuals with sluggish and inactive nervous systems stand it comparatively easily.

Closely studying the subject it must be admitted that pain should not be considered as a pathological condition but simply the alarm or indication that some injury or pathological condition does exist.

Osmosis.—In its simplest form the reaction of solutions of varying concentration may be described as follows:

If two solutions of different concentration be separated by a semipermeable membrane, it will be found that water will pass from the weaker to the stronger solution until they are both of the same density. As stated above, this describes osmosis in its simplest form. It has been found that animal colloids, gelatin and fibrin, absorb large quantities of water and increase considerably in size and this reaction is dependent upon the reaction and also upon the nature of the acid or alkali present. To apply the principles of osmosis to local anesthetic solutions a few words of explanation will be necessary.

Solutions of the same density as the tissue fluids are called isotonic or isomotic solutions. Hypertonic or hypotonic are those of greater and less concentration. Considering the action of the various concentrations upon the single cell, isotonic solution being of the same density as the cell content will cause no phenomenon to take place. Hypertonic solution will cause the cell to become crenated while hypotonic solution causes a swelling or enlargement of the cell.

As the result of the reaction of cells to hypotonic and hypertonic solutions pain, swelling, production of a wheal or even sloughing may be produced by a complete disregard of the laws of osmosis.

Local anesthetic solutions as a rule are injected with pressure and even an isotonic solution when the tension of the injection is much greater than that of the tissue may cause a reaction of the tissues, the pain is generally quickly overcome by the action of the local anesthetic, but in some cases this painful condition and also tissue changes may result after the local anesthetic has ceased to act.

For this reason Fischer recommends the slow injection, never blanching the tissue and also the application of pressure upon the

part to assist penetration of the solution into the deeper structures and also to relieve the pressure in the small area injected.

Osmosis consequently plays a minor part in the effect of isotonic solutions upon the tissues, but as will be shown under the subject of preparation of solutions, it must not be lost sight of in the construction of local anesthetic solutions.

Some of the conditions in which local anesthesia is contra-indicated are:

Arterial sclerosis, in which the altered condition of the vessel wall does not tolerate additional blood pressure.

Diabetes, and nephritis; in the latter condition there is danger due to intoxication.

Children, the aged, epileptics, highly nervous and neurotic subjects are poor subjects for local anesthesia.

Cocain Hydrochlorid.—Cocain hydrochlorid acts as a protoplasmic poison upon all living protoplasm, first stimulating, then paralyzing it. Readily soluble in water, its solutions are decomposed by heat, the products of decomposition being Ecgonin, methyl alcohol and benzoic acid. The soluble salts are readily absorbed by mucous membranes, producing anesthesia. It does not completely block all the nerve impulses, as may be shown when applied to the tongue. Salty substances seem to taste more salty while agents of a sweet nature seem tasteless. In contact with the blood vessel wall it brings about a constriction of the arterioles, showing that it stimulates the vaso-constrictors. The higher centers of the brain are first stimulated and then depressed. Respiration is first stimulated, in large doses convulsions of the respiratory muscles followed by paralysis in fatal doses. Upon the heart and vascular system it seems to first stimulate the force and frequency of the heart action and raise arterial tension by contraction of the peripheral arterioles. In large doses the stimulation gives way to a depression.

Toxicity of Cocain.—Disturbances in brain function giving rise to conditions of excitement occur very soon or even two hours after injection. Hallucinations, irregular respirations, precordial depression, very thin and rapid pulse, pallor of the face, coldness of the extremities, abundant perspiration, rise in temperature.

Cocain, as has been stated, is a protoplasmic poison. It retards ameboid movements, and inhibits diapedesis of the leukocytes. It also acts as a specific toxin upon the nerves, kidneys and the heart.

Novocain Hydrochlorid.—Synthetic product. Soluble in water 1:1. Melts 156 deg. C. Can be heated to 120 deg. C. without decomposition. Its solutions may be repeatedly boiled without decomposition, and they are also supposed to possess slightly antiseptic action. When suprarenal extract is added the solution should be boiled for a short time only. It is claimed to be 1-7 less toxic than cocain, and when injected to be equal in anesthetic property to cocain. It does not possess any power over the vaso-constrictor. Novocain has the same action on peripheral sensory nerves as cocain.

The circulation or respiration in moderate doses are not affected by novocain. Its solutions are non-irritating to the tissues, and its low toxicity may be readily shown by a comparison of the lethal dose with that of cocain.

Adrenalin Chlorid.—Suprarenin, suprarenal extract.

The advantages of using adrenalin chlorid with local anesthetic solutions are, to intensify the action, prolong the anesthesia, prevent the ready absorption in the general circulation. At the present time there are two varieties of suprarenal preparations on the market. That obtained by extracting the suprarenal gland and the other a synthetic preparation. The preparation that is generally used is the 1:1000 solution. Objections have been raised to the animal extract principally because of its lack of stability, inconsistency of action, and the inability to properly sterilize by heat. The latest achievement in synthetic preparations has been thoroughly tested and seems to answer all requirements.

Some of the drugs used as local anesthetics have interfered with the action of adrenalin. It is claimed that the action of cocain is not intensified by the addition of adrenalin and it requires the same quantity of cocain with or without adrenalin. On the other hand novocain is materially aided in its action by its addition. This is a happy condition as novocain does not possess vaso-constrictor action while cocain does.

In considering the quantity of adrenalin, it may be well to quote a few experiments which have been performed.

A one per cent isotonic novocain solution, containing one mm. in 20 (average syringe full) showed a marked anemia and the anesthesia lasted more than an hour.

A one per cent novocain solution with two drops of adrenalin to each 16 drops of solution showed a very marked adrenalin effect, also after pain resulting from the injection.

A half per cent solution containing one drop of adrenalin to the cubic centimeter showed marked anemia. From this we may see that one mm of 1 : 1000 adrenalin is the required strength of the solution.

Ten minims is about as large a dose of adrenalin as should be introduced into the general circulation, and this is a rather large dose in certain pathological conditions. The fact to be remembered is that adrenalin is more toxic than novocain. By comparing one mm. of 1:1000 adrenalin solution to the cubic centimeter would amount to a 1:16000 or about .00005 grams or 1/1200 grains, while novocain, as we know, is used in one-third of a grain concentration.

The toxicity of adrenalin is often lost sight of in local anesthetic solutions.

Infiltration anesthesia is anesthesia brought about by infiltrating a tissue with a suitable anesthetic solution, the anesthesia being due to the contact of the solution with the sensory nerve fibers which become gradually paralyzed in from five to ten minutes.

Conductive anesthesia is anesthesia brought about by injecting an anesthetic solution in the vicinity of a fair-sized nerve trunk. The solution penetrates the perineurium into the entire nerve substance inhibiting it.

Sensation is conveyed to the organs about the oral cavity, masticatory apparatus, by the fifth nerve. Briefly stated, the nerves supplying the superior maxillary and the mandible are as follows:

Upper incisors and cuspids are supplied by the anterior superior dental nerves. The upper molars by the posterior superior dental. The bicuspid being supplied by the anterior and middle superior dental nerves. The inferior dental nerve furnishes the nerve supply to the mandible.

An agent to be used as a local anesthetic:

1. Should produce a durable and diffusible action and a maximum anesthetic effect with a minimum of tissue changes.
2. It should be non-toxic to the organism when absorbed in doses required to produce the fullest anesthetic effect.
3. It should not permanently injure the tissues.
4. Permit sterilization by heat.
5. Should be soluble.
6. Compatible with adrenalin.

Local anesthetic solutions may be divided into two classes: stock solutions, and solutions prepared from tablets at time of operation. If stock solutions are used they should be sterilized with heat; if they will permit of this, if they will not, it is better not to use them. Some operators are in the habit of using stock solutions of novocain and adding the required amount of suprarenal extract just before using.

It is generally claimed that the best method is to use the tablets and boil, thus having a fresh sterile solution.

In regard to the tablets on the market I have noticed some containing novocain, adrenalin and sodium chlorid, which discolor badly, indicating that the adrenalin had decomposed, on the other hand, tablets containing the synthetic suprarenal product did not show discoloration. The tablets containing novocain suprarenin synthetic when used with a normal salt solution or a modified Ringer solution are also very efficient in their action. It is claimed that sodium chlorid when incorporated with novocain and suprarenal extract cause a decomposition of the suprarenal extract. I have found this to be the case with the extract from the gland but as yet have not found this to be so with the synthetic product.

Fischer recommends the use of modified Ringer's solution consisting of sodium chlorid 0.5%, calcium chlorid 0.04%, potassium chlorid 0.02%. This mixture may be obtained in tablet form and some makers have placed a tablet upon the market, one tablet to 10 cc. of water forming the desired solution.

There is just one word which I wish to say in regard to the water used in the preparations of an anesthetic solution. Remember that the water should be freshly boiled and should be distilled water. In using tap water and then boiling, this water contains inorganic salts and the salts added to the water may

raise the specific gravity or osmotic pressure to such a degree that the solution will become hypertonic.

The alkalinity of the water in some localities, particularly if through repeated boiling the salts become more concentrated, affect the novocain with the separation of the insoluble novocain base.

For dental purposes one-third grains of novocain and the equivalent of one drop of the 1:1000 1/1200 suprarenal extract solution to the 16 drops of water containing salts, bringing the solution up to the same specific gravity as the tissue fluids, that is an isotonic solution, is all that is required.

Conductive anesthesia may be used to advantage particularly in the lower jaw. A single injection about the inferior dental foramin will suffice for the molars on that side, while combined with an injection at the site of the mental foramin on the same side will also include the bicuspid, if the mental foramin on the opposite side is injected, that is using three injections, anesthesia may be extended to include the six anterior teeth, making ten or eleven teeth which may be extracted with but three injections. By making four injections, two at the sites of the inferior dental foramin, one on each side, and two at the sites of the mental foramina, all the teeth in the lower jaw will be anesthetized.

Conductive anesthesia of the superior maxilla is far more difficult and to me infiltration serves the purposes, consequently I have not paid particular attention to this phase of the subject.

One objection to conductive anesthesia is the possibility of the needle breaking and to overcome this an iridio-platinum needle may be used. Iridio-platinum needles possess the advantage of not being brittle and may be readily sterilized by passing through the flame, but they do possess the rigidity of the steel needle.

In conclusion I wish to offer an apology for the manner of presenting this paper, but I was stimulated in my endeavors because of the fact that this subject seems to me to have been neglected in this locality.

Within the last few years local anesthesia has been making much progress both in surgery and dentistry in spite of general anesthesia with our improved methods, and the taking up of analgesia by the dental practitioner.

In order to thoroughly understand the various phases of the subject of local anesthesia it would require a series of lectures with demonstrations. I have attempted to cover the subject in a rather hurried manner and in so doing hope to have promoted enough interest to stimulate others to use the most recent advance which has been given to the profession.

A PRESSING NEED IN DENTISTRY.*

BY C. N. JOHNSON, M.A., L.D.S., D.D.S., CHICAGO, ILL.

Probably the average practitioner if asked to name the most pressing need in dentistry today would unhesitatingly answer that without doubt the thing most demanded was a preventive for the dental diseases with which we are daily battling in our offices; such for instance as dental caries, pyorrhea alveolaris, erosion, etc. This is a perfectly natural point of view for every conscientious practitioner, and it is an ideal toward which we should all work most assiduously. But we must not permit our enthusiasm over what may ultimately be accomplished in this direction to blind us as to the most pressing need of the hour.

I do not wish to be considered pessimistic when I make the statement that it is a far cry to the day when dental disease will be eliminated. In the first place, it will require much research—possibly many years of it—before a reliable preventive of caries is discovered. It will then take time to demonstrate its practicability. After all this is settled beyond the question of doubt it will be years before the people can be impressed with its importance and even more years before they can be forced to avail themselves of its advantages. Jenner discovered the smallpox vaccine many years ago, and it has been available for the public ever since; yet we find smallpox existing today through failure on the part of the people to universally employ the vaccine as a preventive.

Dental caries is so insidious and develops so rapidly that it is inconceivable to believe that we shall within the next decade or two eliminate it from the human family. We are placed in the position then of being obliged to combat this disease by

*Read before the American Dental Society of Europe, Paris, 1914.

remedial agents in the form of fillings for some time yet, and we should not cease in our efforts to do the best service for our patients under existing conditions.

This introduces what I deem to be one of the most pressing needs of the profession at this time, viz., a new filling material. We are reasonably well equipped for saving decayed molars and bicuspid. With gold foil, gold inlays and amalgam, we can serviceably meet most of the conditions which confront us in these teeth so far as decay is concerned. It was a very great step in advance when the inlay was perfected to its present state by the casting method of Dr. W. H. Taggart. That advance seemed to round out our possibilities and furnish us with the needed facilities for meeting a certain class of cases which in the past had imposed too much drudgery upon the operator or too great a tax on the patient. It made dentistry less irksome, and its introduction was a decided blessing to humanity. It is safe to assert that in the mind of the average practitioner of today the chief problem which presents itself so far as saving the natural teeth from caries is concerned does not occur to him in connection with the molars and bicuspid. The argument as to the relative value of gold foil and the gold inlay does not particularly enter into the question in this relation. With one or the other or with amalgam he knows he can meet the emergency, and meet it in a manner satisfactory to himself and his patient.

But when we come to decayed incisors or cuspid with all the possibilities of exposure to view the case is entirely changed, and we are confronted with a dilemma which is becoming more and more a serious matter for our consideration. We can save the anterior teeth from decay—there is little question of that—but the thing which concerns us in an ever increasing ratio is the problem of saving them without exposing the evidence of our operations to view. As we advance in our esthetic sensibilities we rebel more and more against the exposure of gold to public view in the teeth, or, in fact, to any display which advertises to the world that the teeth have been sufficiently defective to require repair. What we most need then is some filling material for incisors which will so match the natural enamel that we may disguise the evidence of our work, and which has the requisite physical properties to make it reasonably permanent.

This is the dilemma which today confronts every conscientious practitioner, and while I am aware that I am introducing no new theme or advancing no original theory, yet I venture to emphasize the situation at this time for the reason that as our problems with posterior teeth have, as has been intimated, diminished immeasurably in recent years, this problem of the incisors looms higher on the horizon as time advances.

I am quite aware that in the minds of many excellent men in the profession this problem seems to have already been met, but let us examine carefully the evidence and see. It is true that porcelain held out an alluring hope of solution, and indeed it was a great advance in appearance over gold, but, for the time ignoring the question of its durability, let us look into the matter and see if after all porcelain can be accounted as really satisfactory from an esthetic point of view. Porcelain when skilfully manipulated presents a very favorable appearance at conversational distance from the patient when first inserted, but it is the history of the vast majority of these operations that after the lapse of time there is an unsatisfactory condition of the margins which renders the inlays unsightly. This condition occurs in the hands of all classes of operators—not so glaringly noticeable, of course, with those who are skillful and painstaking or who have a particular aptitude in the manipulation of porcelain, but it occurs with sufficient frequency with every operator to stamp it as a distinct disadvantage in the use of porcelain.

That porcelain has serious limitations as a filling material must be evident from the fact that its use for this purpose has become so restricted. Nothing proves a question of this character so completely as the actual test of experience, and it is safe to assert that there is not one-fifth the porcelain used for filling teeth today that there was five years ago. If porcelain had been satisfactory the profession would never have discarded it so summarily. And yet I cannot pass without the statement parenthetically that I still believe there are some cases in incisors which cannot today be met so satisfactorily with any material at our command as with porcelain.

This brings us to a consideration of the silicate cements. Undoubtedly they have in many instances supplanted porcelain, and there is no question that in appearance they are a step in

advance over porcelain. They can be matched with the natural enamel so as to defy detection and yet—we have the inevitable “but” which faces us in the consideration of every kind of filling material yet suggested for these cases. The simple fact is that the silicates have not demonstrated their serviceability sufficiently for us to rely on them for permanent work. It does not suffice that we see occasional cases where this material gives satisfactory service—this does not alter the main fact that it is more or less freaky in its behavior, and disappoints us too many times to be classed as reliable. And as yet no man can predict with certainty just what the silicates will do in a given case. With gold—which in comparison with all other filling materials must yet be considered the standard of reliability—we know what the result will be so far as the material itself is concerned if we subject it to a certain technique, but not so with the silicates. A uniform painstaking care in manipulation will not bring uniform results in the behavior of the material, and the operator if conscientious always uses it with more or less of a reservation.

This is not intended as a severe criticism of the silicates nor is it meant to discourage the manufacturer. He is doing the best he can to furnish a material which will appeal to the profession as reliable, and if in some of his claims for the silicates he oversteps the bounds of fact as borne out by practical experience in the mouth, he must not be too severely censured. It is human nature to see the virtue rather than the limitation of our own particular product, and it is only in accord with long established commercial custom to emphasize the virtue and ignore the limitation.

The unfortunate thing is that extravagant claims are quite likely to mislead operators of limited experience, and they in turn may unwittingly promise patients more than is later realized in fact. This is disappointing to the patient and disconcerting to the operator. Continued discrepancies between promise and results lead to strained relationships between patient and practitioner, and practitioner and manufacturer; and anything which breaks down the confidence that should exist between those whose interests are so closely allied is demoralizing and disintegrating. After all, it is better to hew to the strict line of fact in this as in all other relationships of life.

And yet as we view the matter today, with the acknowledged friability of porcelain, and the unsatisfactory condition of the margins of porcelain inlays whereby many of the best-made inlays after a time show a discolored line between the filling and the tooth, we must acknowledge that if we are to insert fillings in incisors and avoid conspicuous operations we must employ the silicates quite extensively. There is a wide range of legitimate service for them provided we use them intelligently and with a frank recognition of their limitations. Many patients will prefer having fillings renewed occasionally rather than accept gold with its tawdry display or porcelain with its unclean margins.

And yet to the operator whose ideals impel him to the highest class of service there is a terrible lowering of standards in this repeated patch work of renewing fillings. There is an implied acknowledgement in it of his inability to meet the situation fairly and squarely, and in his very soul he cries out for something better and more reliable.

It is this dilemma which has forced on your essayist the conviction that today the most pressing need in dentistry is for some material to meet the class of cases under consideration. That the future will bring this about no one can doubt. The need is so urgent that human ingenuity must meet it, and no man can predict the moment of achievement. Whether it will come as the result of improvement in the materials already in use or whether an entirely new product will be evolved remains to be seen. Let us not rest content until this one great desideratum shall have been attained—thereby removing from the profession its one chief obstacle to giving satisfactory service to the people.

I must not close without calling attention to a certain combination of filling materials which, though not ideal, will meet a given class of cases more acceptably than any other, and with which every progressive operator should be familiar. In cases of incisors where the incisal angle is missing, thus presenting the problem of stress and conspicuous appearance, we may sometimes serviceably employ a gold inlay with a labial face of silicate cement. The wax for the inlay is carved in the usual way and properly contoured. Then before casting, the labial surface

of the wax is cut away to form a cavity into which, after the inlay has been cemented to place, a proper shade of silicate cement is inserted. By this combination we have the gold where stress is likely to occur, and the silicate where it is exposed to view. This method in some cases is quite serviceable, but it obviously cannot appeal to us as would some method which enabled us to fill the entire cavity throughout with an indestructible and harmonious material. And so the pressing need is still with us. Who will supply it?

THE TREATMENT OF PYORRHEA.*

BY J. P. CARMICHAEL, D.D.S., MILWAUKEE, U. S. A.

I make my acknowledgement with no small degree of pride that your kind and courteous invitation, extended to me through your secretary, comes as a crowning glory of over thirty years of earnest endeavor in the practice of dental surgery, and, while I appreciate with an almost unmeasurable gratitude, the dignity you have thus conferred upon me, in no sense am I disrobed of the humility born of human incapacities.

We, today, in modern dentistry, are facing problems of greater moment than ever previously confronted the profession. Our energies are no longer permitted to direct themselves along the purely mechanical and esthetic lines as of old, but we are facing newer and graver problems.

The past decade has busied the professional energies in an endeavor to cope with distinct morbid entities. The disease known as pyorrhea alveolaris, contemptuously termed, "The Aristocratic Disease," by those who wish to discredit its manifest significance, is the problem of our day and age. Yet so comparatively recent is its recognition and so notoriously unavailing its treatment, that no one disease has earned for itself greater diversity of opinions as regards its nature, prevalence, etiology, and, treatment, than has this one condition.

I am unwilling to have this disease thrown into the forever-unknowable by classifying it amongst the diathesis and I do not believe it to be a local manifestation of a systemic dis-

*Read before the American Dental Society of Europe, 1914.

turbance, but I regard it as a purely local process favored only in its existence by systemic debilitation. That this disease does not wait on systemic derangements for its development, is most convincingly shown by the fact that the stout and plethoric are attacked as well as the frail and anemic. In a great majority of cases the concomitant bodily ailments consequent to and not causative of pyorrhea, are the visible outgrowths of the disease. When once established in its chronic stage, pyorrhea exerts a doubly detrimental force on the general body health. The continuous and protracted production of the quantities of pus, daily cast off from a deep seated widespread case of purulent alveolitis, must be an enormously debilitating factor on nature's protective forces. But when we add to this the injury unavoidably consequent to the ingestion of this highly toxic matter, we are then in the possession of data sufficiently elaborate to account for the long train of systemic disturbances commonly noted in connection with this morbid process.

After a variable period of time, the alimentation of the infectious purulent matter will of necessity irritate the mucosa of the whole digestive tract, resulting finally in such disease conditions known as septic gastritis and illeo-colitis, and those conditions in turn producing dyspepsia, indigestion and lastly emaciation and lowered vitality.

The toxic elements contained in the pus thus ingested, are absorbed through the intestinal mucosa into the general circulation, and through this media all the tissues of the body are bathed in the toxic materials, to which the endless train of systemic disturbances is directly attributable.

By considering pyorrhea in this light of its being purely a local infectious process, and the bodily derangements as being merely symptomatic evidences of its existence, we not only confer upon the process its proper dignity, but in addition we are taking a rational, practical, and scientific attitude, as our guide for its treatment. That it is a local process, it seems to me, no searching mind can doubt, and it is only by so restricting the scope of our vision and limiting our treatment, that a cure is ever realized.

The past has recorded many wide deviations from this view, and aside from the palliative effects secured by various treatments, little of value has been accomplished.

For a number of years I have recognized the importance and significance properly attached to pyorrhea, and in my efforts to combat the progress and overcome the disease, I have considered or applied all of the different methods, each in their day claiming to be specific. Various methods of curing the morbid condition have been advanced, and superficially viewed from a theoretical standpoint, each in its turn appeared meritorious. My earliest conception of the disease seemed to warrant local intervention by mechanical procedures; and, while I have found it efficient in quelling the progress of the disease, I have never in all the cases I have treated, been able to effect a desirable cure. Upon this discovery, I sought to refer the inefficiency of the method to the injury invariably done in the procedure. This was not a difficult task to do, when I realized that the calcareous deposits that were needed to be removed, were inseparably adherent to the peridental membrane, to the extent, that on their removal, that structure was either permanently injured or entirely removed. The fault of such a procedure soon became obvious to me when I realized that on removing the peridental membrane, I was removing one of nature's most proficient means in the process of bone regeneration.

For many years there has been a division in the scientific world, both medical and dental, as regards the role played by the periosteum in the regeneration of bone. Clinically, each division has proven its contention, thus making it apparent that neither were absolutely right. However, if we consider the requisites for bone formation, we are able to substantiate the claims of both. It has been proven, experimentally, that regeneration of bone tissue can be accomplished without aid of the periosteum. This process is accomplished by the means of the osteoblasts lining the marrow cavity, and small Haversian canals.

Turning our attention to the periosteum, we find it to be composed of the same bone forming elements, and, while bone regeneration may be accomplished without aid of the periosteum, we are forced to conclude that under conditions not strictly favorable to bone regeneration, the probability of its reforming will be enhanced proportionately as the periosteum is retained. Narrowing our gaze now to the destruction of bone wrought by pyorrhea in the alveolar process, we find structure identically the

analogue of structures found elsewhere in bone. The small canals and canaliculi of the alveolar process are lined throughout by a layer of osteoblasts that are engaged in the formation of bone, and in the case of a pyorrhea pocket, when the progress of the disease has once been arrested, they play a highly regenerative function. On the other hand, the peridental membrane enveloping the root and lying adjacent to the cavity, has intermingled in its meshes of transverse and longitudinal strands of fibrous tissue, as a distinct matrix, fibroblasts, which combined with the osteogenetic powers of the process itself, are capable of repairing an immense cavity formed in consequence of alveolar necrosis. It becomes apparent to even the casual observer that, since the two restorative elements, one located within the pericementum and the other in the process itself, regeneration is doubly likely to be perfectly accomplished in the presence of the peridental membrane, and that the removal of this structure lessens the hope for regeneration correspondingly as the membrane be destroyed. Not only is this membranous structure important in the regeneration of bone, which may in some instances, be accomplished without its aid, but through its attachment to the cementum it furnishes a firm anchorage of the tooth to all of the newly formed elements, thus giving the normal mobility to the tooth and preventing ankylosis as well.

To this effort at retaining the peridental membrane in the treatment of pyorrhea, considerable objection may be raised, on the basis that by the time the destructive process has so far advanced as to produce pockets about the teeth, the adjacent membranous structure is likewise involved and dead, and its preservation an object no longer to be sought. In a certain very definite measure this is true. In a long continued septic process more or less of this structure is invariably destroyed, though never, I believe, in its entirety. That portion void of life, should be cautiously removed, care being taken not to injure the uninvolved parts. Of those parts still possessed of the properties of life, I will broadly state that the membranous cores, known as "Sharpey's Fibers," embedded within the cementum, are by all means the latest elements to be destroyed, and from the cellular elements therein contained, regeneration of a reparative nature obtains, after the infective process has been eliminated. Through

the agency of this newly formed fibrous structure the tooth gets a membranous attachment to the reformed alveolar process, giving us thereby a reasonable substitute for nature's primary structural elements. This fact in its fullest significance is daily annoying the clinician, who, regarding pyorrhea as a local process, aims to cure the condition by instrumentation, and I believe there is a strong tendency on the part of the profession to abandon the process as an unaided specific treatment.

Of course those who regard the process in the light of its being a disease of systemic origin, are ever ready to speak most disparagingly of any other than that of systemic treatment. Blind to the nature and origin of the disease, they would have us believe that in their vaccine therapy lies the one and only hope of eliminating the morbid process. But viewed from the angle at which I see the disease clinically, I cannot comprehend any basic principle on which vaccines may be indicated in this condition; and on the following facts do I base my conclusion.

In my consideration of this problem, I have not regarded the stock vaccines because of their obvious inefficiency, but have limited my respects to the so-called autogenous vaccines prepared under strictly aseptic precautions. Still, despite those painstaking efforts to be specific, I cannot comprehend how, in this condition, their use is indicated.

Vaccines have their field of operations in cases of specific infection, in the hope of stimulating the production of specific and immediately antagonistic antibodies in the blood stream, but in the case of pyorrhea, at no time can the infection be said to be specific, and we will see why this is true.

Normally, the mouth is the inhabitant of from fifty to sixty different species of organisms, some pathogenic and others non-pathogenic, whilst the vast majority are saprophytic. However, there are but very few common to every mouth at all times. When infection has once established itself in the case, either of acute or chronic pyorrhea, definite organisms may be found engaged in the productions of the disease at one particular time; and from those organisms engaged in the process, autogenous vaccines may be prepared for later administration. But in the time elapsing before the administration of those vaccines, conditions within the affected area under all probability have

changed. The organisms engaged in the process at any particular time may very easily be displaced by other pathogenic germs, and when the vaccines are administered, antibodies are produced to combat the progress of organisms no longer engaged in the destructive process.

In addition to this difficulty, another point presents itself for consideration. The vaccines are used in an endeavor to quiet local and systemic disturbances, presuming that they arise in consequence of a condition of sapremia or septicemia. I do not believe, however, that either condition exists for the following reasons:

First—The systemic symptoms manifested by the patient are quite unlike the symptoms generally shown in those conditions.

Second—In order that we have a condition of sapremia or septicemia, it is essential that the pressure within the infected area shall exceed the pressure within the blood vessels themselves, and inasmuch as the pyorrhea pocket in the vast majority of cases is in open and direct communication with the oral cavity by means of an external fistula, the toxic bacterial products liberated in the pocket are far more frequently emptied into the mouth rather than gaining entrance to the circulation. In this way they are ingested into the alimentary canal, from whence a long train of disturbances arise. The purulent matter thus ingested contains the toxins of pathogenic bacterial action together with the ptomaines and leucomaines of saprophytic organisms. The toxins thus ingested are rendered innocuous, though poisonous, in the process of digestion. The products liberated by the saprophytic organisms are substances of an alkaloidal-like nature, and these combined with the innocuous toxins are capable of producing exceedingly deleterious systemic effects, which no manner or amount of vaccines therapy can prevent.

In the case of alkaloidal substances, such as morphine, codien, and strychnine, the patient may develop a certain limited degree of tolerance to their effects, yet no one hopes by vaccines to furnish a protection against their harmful influence. So it is with the toxic elements absorbed in consequence of the elimination of poisonous substances formed in a pyorrhea pocket. Yet here we have suggested to us in the theory of vaccine therapy

the hope of furnishing unqualified immunity against their affects, but clinically, experimentally, and theoretically, such a hope must eternally prove unavailing, and in my opinion, no conscientious, scientific, practitioner of dentistry will ever offer or suggest to patients the hope of curing pyorrhea from the use of vaccine.

We may then ask, since other modes of treatment are so unavailing, how best can the disease be treated? I will state briefly that I do not specify any routine measure for a condition of so wide a range of pathologic disturbances as is met with in this disease, but I do recognize the importance of meeting certain indications so generally present, and I endorse no treatment that fails to take cognizance of those special points.

In order that we appreciate fully the methods to be employed in the treatment of this disease, we will best understand, by taking a typical chronic case of pyorrhea, limited in its extent to several teeth, for our consideration; and here let us note the conditions that confront us in our applications of any treatment. We note elongations, irregularities and malocclusions of the teeth, the gum tissues are shrunken and cyanotic, presenting a distinct angular appearance, with retraction from the gingiva, leaving a hollow recess leading toward the apex of the tooth, and in communication with the affected area of alveolar necrosis, constituting a so-called pyorrhea pocket. Upon our insertion of a probe or curette into this pocket, we find considerable of the alveolar process surrounding the neck of the tooth involved, and containing pus and debris from the broken down bony structure. The periodontal membrane is always more or less involved with progressive destruction, beginning at the neck, leaving in many cases only the cores or membraneous process that extend into the cementum of the tooth. On looking carefully at the gum tissue, we will note a distinct line of a deeper tint running parallel with the gum margin. This line marks the site of an infected duct, leading from the gland in the gum to its point of opening on the gingiva, but which at present, owing to retraction and eversion of the gum tissue, may be considerably displaced. Having noted the conditions that confront us, and being certain of our diagnosis, we will now regard the various indications to be dealt with in our application of treatment. The various points will be dealt with in the order named:

First—Relieve the infection.

The abundance of soft infectious matter lodged on and about the tooth, acting as a replenishing factor of an unending infection, must be removed. This is managed most efficiently in the manner which I will designate under prophylaxis.

Following this, on the same day the contents of the pockets and adjacent tissues are relieved of their gross infectious matter, by thoroughly spraying with a mild, soothing antiseptic solution, avoiding the use of astringent solution at all times. This removal of the soft accumulations will be rapidly accompanied by a marked subsidence of all acute symptoms, and in some instances, according to the individual case, this mildly stimulating treatment must be continued for several days, before making the disease area the primary object for immediate consideration. All adherent deposits formed on the peridental membrane, together with the gross infectious matter contained within the pocket, are removed by instrumentation, after the application of a dehydrating paste, that aids in the detachment of the deposits from the pericementum, thus reducing to a minimum the possibility of injuring that structure. This operation is carried out in minute detail to completion, on each tooth undertaken for treatment, at each sitting. In the surgical removal of those deposits, a file, so designed as to leave a perfectly smooth surface may be used. Following the removal of all available infectious matter, the pocket is to be filled with a mild antiseptic paste, composed of boric acid and glycerine. This paste not only has the property of controlling the infection, but seems to possess the additional power of absorbing the toxins as well. In my mind those measures thoroughly meet the points included in our first efforts, and we find our next indication.

Second—Exclude the possibility of a re-infection of the involved structure.

The mouth under most any condition contains the organisms engaged in the original process of infection, and their re-entrance into the diseased area at this stage of the treatment must positively be prevented. This is done by sealing the pockets and gaping gum margins with medicated parafin, that may be so impacted as to retain its position and thus exclude the re-invasion of the diseased area by pathogenic germs. In addition to this, the

secretions from the mouth are prevented from entering the area of previous involvement, so that their irritating influence is no longer felt.

This dressing is judiciously changed from time to time as conditions warrant, and we are now left to deal with special points of a reparative nature, and which I designate as the last and most important indication to be dealt with so far as ultimate cure is concerned.

Third—Relieve the infection on the glands of the gum, thereby inducing a normal secretion and at the same time overcoming the static circulation in the neighboring parts.

I know of no other means of accomplishing this end than that provided by the oxygen vapor treatment brought to my attention and first introduced into the profession about three years ago, by Dr. W. F. Dunlop of New York City.

We are thus able to meet all of the varied points presenting for consideration and are now working along lines that bid fair to recovery from the disease. While regeneration is going on we correct the deformities by tooth manipulation designed to aid in the process of repair.

Thus far we have limited our consideration wholly to the treatment of the disease, after it has once established itself, but to my mind, no treatment is complete that does not fully recognize the prophylactic measures essential to the prevention of disease. In order that we may fully realize the preventive means that we are to adopt in the elimination of this disease, it is of paramount necessity that we understand the various stages through which the process must pass, before it is finally established.

Narrowing our view of pyorrhea down to the stage in which the pericementum and alveolar process are involved, to the point in which liquification of the tissue elements has begun, we note certain disturbances without the existence of which, the disease could not have involved those deeper structures, and it is with those predisposing features, that our prophylactic consideration is immediately concerned. So long as the interproximal spaces and tooth surfaces are free from adhesions and accumulated organic matter, this disease will never gain an existence, but when because of a disturbed metabolic equilibrium, either local

or general, secretions of an abnormal nature are poured into the oral cavity, the deposition of adhesions obtains, serving in turn as a retention bed for organic matter. In this organic matter, microbic action is soon begun, with a consequent effect on the adjacent structure.

The toxic elements formed in this localized bacterial action produces an inflammatory condition of the glandular structure, located within the gum tissue. An altered secretion is thereby caused to be poured out on the gingival surface following which there is a loosening of the gum tissue about the neck of the tooth. Following this, organic matter easily insinuates itself beneath the gum margin, bringing pathogenic organisms in immediate contact with the periodontal membrane, and alveolar process. Liquifaction of those structures soon follows and at this point we have what is most generally recognized as a well developed case of pyorrhea. Obviously this disease, as limited to a destruction of the alveolar process, may be aborted, if we but effectively intercept its development at any point prior to involvement of the osseous elements in the neighborhood of the pericementum.

It was with this end in view that the use of tooth brushes and various pastes were inaugurated.

In a certain measure they have had their beneficial effects, but their capacity limited their usefulness, and the end sought was never fully realized. The question may arise as to why this is true, but if you will reflect for a moment on the nature of teeth and gums in the early stage of pyorrhea, your answer is apparent. In this retained organic matter bacterial action is established, producing a septic inflammation of the gum tissue, and with the gums in an infected state, the service rendered by the use of the tooth brush is nominal, because of the aggravating influence upon the condition. The mucous membrane of the tender inflamed gum is abraded, opening up new avenues for increased infection when the stiff bristles of the brush are vigorously applied to the gum surface. Hence it is apparent that the use of the tooth brush is contra-indicated at this stage. Not only does the toothbrush fail to remove the adhesions and organic matter located in the interproximal spaces, but it is found that the removal of similar deposits, formed upon the tooth surface, is so

eminently resistant to the brush, that the application of gritty substances was thought to be advisable. Those dentifrices worked admirably so far as removing the adhesions was concerned, but in so doing, scarification of the enamel was the invariable result. This roughened condition readily predisposes to the subsequent deposition of foreign matter, that may seek lodgment upon the tooth surface. Hence we recognize the importance of securing a substance that will not only effectively aid in the removal of adhesions, but will increase the smoothness of enamel outline, thereby enhancing its power to remain clear of clinging matter.

With the undisputed fact before us, that the teeth must be ever free from foreign matter to insure against developing diseases, we are curious to note how this can be best accomplished. Clinical experience has conclusively demonstrated that a dry friction rub with an impalpable resistant powder which I have prepared according to my published formula and which is commercially known as Carmi Lusto, accomplishes this end most efficiently by thoroughly removing the soft deposits and promoting the normal life luster of the enamel. The condition in the interproximal spaces is best met with by using a tape charged with the same impalpable powder, that produces the same smooth outline here that is met with on the tooth surface. In this procedure the tape works itself between the loose margin of the gum and the neck of the tooth, producing a smooth, non-infectious surface about which the gingiva tightly clasps itself.

By the adoption of those measures the foci of infection for the diseased gums is abolished, and their return to normal vitality is witnessed by the appearance of a normal secretion upon the gum, and a fading out of the inflamed area.

This mode of treatment has wrought the reduction of disturbances to a degree in which the development of disease of local origin can be kept under complete control.

The universal recognition of those factors and the proper directions from doctor to patient, will be a far reaching result in the elimination of oral diseases, which today is fast becoming the highest ideal of scientific dentistry.

PROCEEDINGS OF SOCIETIES.

AMERICAN DENTAL SOCIETY OF EUROPE, FORTY-FIRST ANNUAL MEETING, HELD AT PARIS, FRANCE, JULY 30, AUGUST 1, 1914.

DISCUSSION OF THE PAPER BY DR. C. N. JOHNSON ON "A PRESSING NEED IN DENTISTRY."

DR. CAPON (Philadelphia)

Said it was known from experience in the last year or two that a kind of silicate cement—he did not suppose it was any different except that it had to be made thinner—made an ideal restoration for anterior teeth. He had been using it for sixteen months. Perhaps Dr. Johnson had never seen a well made porcelain inlay fixed with the cement called "tenacit"; if he had he would feel that an ideal condition had been reached. He had seen cases in twelve months that absolutely could not be improved upon, and there was no line of demarcation to be seen. He had had some failures in the use of the cement, but had had more beautiful results. It had great tenacity for a vitrified surface or for a porcelain surface. In fact, when the inlay had to be replaced the cement had to be cut from the porcelain. Yet with all its advantages it had not the tenacity of the good old-time phosphate of zinc cement. The old-fashioned cements had done wonderful work, but if the new cement was used even in its present stage of probable imperfection it would render very good service. If it could be improved in tenacity so much the better. Apart from the line of demarcation, the making of an inlay was not and never would be a common and everyday piece of dental work. It required a particular aptitude and technique

DR. AMES (Chicago)

Said he was rather surprised at Dr. Johnson opening up the subject in the way he had done, because he had looked upon Dr. Johnson as such a religious gold worker that to hear his present paper almost took away the breath. If dentists could have their practices sufficiently in hand to be able to catch cavities in their incipency, whether proximal or labial, and use a cement as good as was to be had, he could not help feeling

that it would be possible to do more for the patient than was ever done with any other material. Dr. Johnson believed that it was necessary to do patchwork dentistry, from time to time refilling the cavities, but he himself was positive that there were materials with which small cavities could be filled in such a way as to make the fillings permanent and beyond the reach of danger by attrition. He was inclined to differ with Dr. Johnson in his statement that the materials were erratic, because the erratic behaviour depended upon conditions. All cements were susceptible to differences of temperature and humidity of the atmosphere. He had worked out a scheme by which a bottle of water could be used as a slab. A thermometer was inserted in the water and a certain temperature was found as the most desirable for fixing the cement. He had found that cements would behave very much better when worked at a temperature of about 60 degrees than when worked at 70 or 80, and 60 degrees was sufficiently low to retard the chemical action on the slab, and 60 was also as low as a cement could be placed in a vital tooth, and during a large part of the year cement could be mixed on a slab at that temperature without condensation of moisture. Tests appeared to show that silicious cements were more reliable than any others. Basic oxyphosphate of zinc was readily soluble in the products of fermentation and putrefaction, oxyphosphate of copper less so, and basic phosphate of calcium much less soluble than other phosphates. There was no doubt that the dental profession was in a fair way of having reliable cements. At present the oxyphosphate cements were probably as perfect as they could be, but the silicious materials had been much improved and he looked forward to still further improvement in them.

DR. C. N. JOHNSON

Said Dr. Capon's experience with porcelain had no doubt proved to him that in many cases there was an unsatisfactory line, and an offensive line. In Chicago dentists looked upon Dr. Ames as an authority with regard to cement. It was true that the erratic behavior of silicate cements was due entirely to the conditions, but it was not everybody that could control the conditions. When it came to the manipulation of gold the conditions could be controlled so that the gold behaved always in the same manner. Dr. Ames had

solved the problem of manipulating silicate cements more nearly than anyone else, but having regard to the extreme variations in temperature in America and variations in the humidity of the atmosphere, the manipulation of silicate cement must always be a very difficult matter. Even with the same manipulation and the same technique there was so much variation in the mouths of different patients that it was not always possible to reproduce in one mouth the effects that could be brought about in another. That was a thing that discouraged him. He wanted something that he knew would be right, and he was pleading for some material that would give as definite results in regard to the anterior teeth as existing materials gave for the posterior teeth. Old men in the profession could afford to make mistakes, but the young man who was starting out had his reputation to consider and if he relied upon what was said by the manufacturers of silicate cements he would get into trouble in time, because those cements simply could not live up to the reputations that were given to them by the manufacturers. He did not blame the manufacturers, and probably would do the same thing himself if he were a manufacturer, as he would see it from one point of view.

He expressed his great gratification at the privilege of meeting the A. D. S. E. Although he had been honored by being permitted to publish the Proceedings for many years the present occasion was the first on which he had attended the meetings, and he hoped it would not be the last. It had been a great pleasure to him to meet old friends from America who were practising on the Continent of Europe and to meet men he had only known by reputation.

DISCUSSION OF DR. CARMICHAEL'S PAPER ON "THE TREATMENT OF
PYORRHEA."

DR. W. J. YOUNGER,

In opening the discussion, said that Dr. Carmichael and himself were in perfect accord in many of the points in the paper. For instance, in that (1) pyorrhea was of local origin; (2) that it was due to bacterial infection; (3) that it commenced in the cervical margin of the alveolus; (4) that when systemic disturbance existed it was due to the passage of the noxious germs into the circulation, either directly through absorption from the foci in the alveoli, from the discharge into the mouth swallowed with the saliva or from the food contaminated with the pus carried into the digestive track;

(5) that the pus so absorbed was capable of producing systemic disturbances and remote lesions, dyspepsia, indigestion, gastritis, illio-collitis, ulceration of the intestinal tract, rheumatic pains in the joints, etc., etc., and in one case he had also heard of appendicitis attributed to that infection. In fact, he pretty well agreed with Dr. Carmichael in nearly all he had said about the infection of pyorrhea and its relation to systemic disturbance. He also agreed that vaccine as a sole agent was unable to cure pyorrhea. Even the most enthusiastic advocates of vaccine therapy were now receding from their position and acknowledging the absolute necessity for the removal of the deposit in order that the serum should have its effect. That being the case he could not understand why Dr. Carmichael said that he had never been able to satisfactorily cure a case of pyorrhea by instrumentation and that the profession were abandoning that method of treatment. The only reason to be given for that failure was that he had never removed the deposit completely. The removal of that deposit in its entirety was an absolute requirement for the cure of pyorrhea. If the slightest particle, even if it were no larger than a point of a needle, were left on the root, its irritating infectious presence would prevent the healing of the socket. But for the purpose of detecting those minute particles a very keen sense of touch was necessary, and if one had it not naturally he must cultivate it or he would never be able to cure the disease, no matter how honest and conscientious his endeavor might be. There were two conditions to be brought about in the cure of pyorrhea. One was the absolute removal of the incrustation, the other the restoration of attachment between socket and tooth. When that did not take place readily he had found lactic acid very successful in accomplishing that result. He would not attempt a discussion of the bacteriological features of the paper, there was too much of it and it was confusing and would occupy entirely too much time. Dr. Carmichael believed that pyorrhea was not the result of a single specific species, but that there were a number of germs capable of producing the disease that could interchange in doing the work. Therefore he did not believe in autogenous vaccines because in the time required to prepare a serum when the injection was made the germs for which the serum had been prepared might have been displaced by a variety that would not be affected whatever by the injection. He (Dr. Younger) still clung to the belief that there was

one specific germ. The antagonists of that idea argued that if there were only one it would long ago have been discovered. But the microbe of scarlatina had not yet been determined. Would they argue in consequence that there was no specific microbe in that disease, but that it was the result of a variety of germs? The most astounding thing to him in the paper was Dr. Carmichael's claim that underneath the pyorrheal incrustation there was a perfect peridental membrane. Such a thing was impossible because nowhere in the human body was an incrustation deposited upon a soft tissue. As the attachments marking the walls of the pockets receded, the inflammatory action destroyed the pericementum and he believed as it did so and separated from the endosteal lining of the lacunæ and canaliculi it caused a calcarious deposit at their openings or mouths, so preventing infection from entering the tooth. The mineral portion of the incrustation was taken from the alveolar bone. That was mixed with the other inorganic substance set free by the bacteria in their action on the structures around the affected tooth and deposited on the root. The pericementum did not even touch the edge of the incrustation; there was always a clean zone of cementum around the incrustation and there was no peridental memberane projecting beyond the attachments of the soft tissue with the tooth. What put it into Dr. Carmichael's head that there was a perfect pericementum between the crust and the cementum he would probably be able to explain, but that idea had evidently warped his judgment and prevented him from properly removing the deposit, for he said great care must be taken not to injure that pericementum in removing the tartar, because he depended on that membrane in reforming the bony socket when it had been wasted. In his treatment after several days' spraying with a soothing lotion he introduced a paste to assist in detaching the crust from the treasured memberane without injuring it! His treatment of pyorrhea was very elaborate and took considerable time, for he took several days in spraying the gum. That spray was the invention of Dr. Dunlop of New York City. After the spraying came the insertion of the dehydrating paste. That also took several days. Then came the removal of all available infectious matter, and to prevent reinfection and re-entrance of the microbes he sealed the pockets with medicated paraffin, which he (Dr. Younger) supposed was to be changed from time to time indefinitely, as there was no

time limit. After that, to prevent the re-establishment of the disease, Dr. Carmichael advised the use of a powder of his invention which kept the crowns and necks of the teeth clean and brilliant. While he (Dr. Younger) considered that long treatment tedious and unnecessary for the usual pyorrhea sufferer, there might be occasionally a condition requiring it at least in a modified form. As he never liked to condemn a treatment until he had proved its inefficiency by a trial, he submitted a patient of his to a spray treatment. That patient was a young lady whom he had treated for some time by the usual method. She was quite anemic, her gums were very thin and delicate and did not respond satisfactorily to treatment. The tartar was very thin and difficult to find and when removed he could get no attachment between the sockets and their roots, which were very deep. Many of the teeth besides remained loose. Believing that was a proper case for vaccine therapy he placed her in the care of a specialist connected with the Pasteur Institute, wishing to see what improvement would result and to what extent through vaccine therapy alone. He discontinued his work. After five applications, finding there was no progress he was requested to resume his work. Twenty applications were made, but with very trifling success; the teeth would not tighten and the vaccine therapy was discontinued. Dr. Carmichael had injected the gums twice with the Dunlop spray and the gums seemed already very much improved. The increase in circulation was quite marked. Whether that would continue remained to be seen, but the promise was good, and he thanked Dr. Carmichael for having exemplified it to him. The case of the young lady was one of the very few that in an experience of fifty years he had been unable to cure, and his sole treatment had been the thorough removal of the pyorrhea deposit and the application of lactic acid. He was thorough in the removal of the deposit and where those deposits could not be got at he had extracted the tooth. But he had sometimes used—instead of extracting—Fluoram, after having thoroughly anesthetised the part to prevent the intense pain that would otherwise result from its application.

DR. G. B. HAYES:

Appreciated Dr. Carmichael's paper and agreed with him in a great many things. In his opinion pyorrhea alveolaris was purely a local disease with systemic disturbances. He doubted whether the causes of pyorrhea had been proved

and whether the causes were the same in all cases, and he also was ignorant of whether the disease could be attacked purely by local treatment or by vaccine treatment. He had had the pleasure of seeing Dr. Carmichael applying the Dunlop treatment and it had impressed him as a very important prophylactic measure apart from the results it might bring about in deep seated pockets. He was much impressed by the thoroughness of the treatment, by the manner in which the medication penetrated into the gums. In one case where the alveolus was diseased the oxygen had passed through the bone from one tooth to another, inflating the glands, and disinfecting in the most delightful way.

Dr. Carmichael said the case Dr. Younger had mentioned had been of great interest to him inasmuch as it had responded very well to his treatment.

The following note on the subject was received from Dr. E. Sturridge (London):

I wish to congratulate Dr. Carmichael on his excellent paper, in which he displays great grasp of the subject and many decided views. The vast field which this paper covers makes discussion, as a whole, almost impossible. I shall confine my remarks to a few points which I consider of great importance and interest: Regarding the absorption of "toxic matter" into the system—the essayist asserts that the toxic elements of pus (that is bacteria) are absorbed through the intestinal mucosa. I do not agree with this altogether, I believe the primary infection takes place by *direct absorption of bacteria* through the actual site of inflammation, which causes a lowering of the resistance of the whole body, and facilitates a secondary infection of the mucosa of the alimentary tract—from the swallowing of pus. We must remember that the secretions of the alimentary tract possess an injective action on bacteria, as a natural means of protection. I must own to my inability to follow the essayist in his views regarding injury done to the peridental membrane by the removal of calcareous deposits. I cannot conceive any one "permanently injuring or entirely removing" the peridental membrane whilst scaling tartar!

The calcareous deposits are never in actual contact with the peridental membrane; the overlaying fibrous gum tissue usually

is, but if we examine a pyorrhea tooth which is coated with tartar we will find something like the accompanying sketch; a distinct

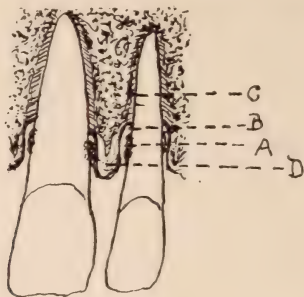


Fig. 1.

- A. Salivary Calculus.
- B. Space above Calculus.
- C. Peridental Membrane.
- D. Inflamed Gum Tissue.

space exists between the lowest boundary of the deposit and the remaining attachment of peridental membrane—inflamed tissue forming another boundary of the pus yielding pocket.

Regarding vaccine therapy (about which we have heard a great deal today), I *am not quite* in accordance with all that has been said, but agree perfectly that autogenic vaccines are in themselves incapable of curing pyorrhea. I have known of cases which have done very well, where skilful instrumentation was carried out in conjunction with the vaccine.

Regarding treatment, I must congratulate the essayist on his thorough and scientific method. I can perceive how he is able to obtain good results by this effective and persistent battle waged against septic infection, and I notice, with considerable satisfaction, that his principal aim is to eradicate bacteria from the site of infection. The method of sealing the free margins of the pockets is most ingenious, but I should fancy a bit irksome. I do not quite agree with his conclusions as to how these anti-septic precautions act. I should think that the good results are *not* obtained by the exclusion of reinfection from without, by the temporary sealing of the pockets with an antiseptic medium: but I think that he accomplishes a method of osmotic disinfection of the adjacent tissues, by keeping a powerful germicide in direct contact with the inflamed and infected tissues for a sufficiently long time to destroy the bacteria which have passed into the

deeper layers of the tissues. The inflammation subsides as soon as the pyogenic bacteria are destroyed, and the tissues become capable of resisting re-infection automatically.

These desirable results I find are effectively and quickly accomplished by electrolytically introducing into the affected areas, antiseptic ions, which are not readily absorbed into the general circulation, but remain sufficiently long to destroy the bacteria which are the direct cause of the disease.

The prophylaxis advocated by the essayist is undoubtedly most essential; by whatever means carried out. I am agreed, it is most important. Personally I am a believer in a stiff brush of adaptable shape, which will act on hygienic principles and produce an active method of massage.

CHICAGO DENTAL SOCIETY.

A regular meeting was held March 16, 1915, with the President, Dr. T. L. Grisaniore, in the chair. Dr. H. R. Raper read a paper entitled, "About Dental Radiograms."

DISCUSSION.

DR. HOLLIS E. POTTER:

I have only one excuse in appearing before an audience of this kind and that is because I am extremely interested in dental infections. I was very much interested in Dr. Raper's paper in which he dwelt so particularly on the subject of dental abscesses, and his remarks prove to me that you are all very much alive to the medical significance of infection allowed to remain at the roots of teeth.

I was very much interested in the list of "don'ts" and "dos" in which he defines the attitude toward dental radiography and dental infections which should exist between the dentist, the radiologist and the physician. It is a delicate matter for an examining physician to call into question all the dental work a patient ever had done and by resorting to X-rays do a veritable autopsy on all devitalized teeth. But the spirit of this meeting proves to my satisfaction that the dental profession has the proper abhorrence of alveolar abscess and is preparing to avoid and combat it with the proper energy in the future.

In my X-ray work on dental disease I have been associated more particularly with the medical side and my increased interest in the subject is due to an observation of a considerable number of cases in which systemic disease has been cured or benefited by the cleaning up of oral infections. The method to be used in curing up dental infection is one for the expert dentist to handle, the physician only demanding the disease be eradicated without unreasonable delay.

Dr. Raper made the remark that the radiograph does not lie, that it tells you the condition that is present, and that the interpretation must be made very carefully and by one who understands the variability of normal structures. I would say it should also be made in the light of what we know about the gross pathology present in early infections as distinct from chronic old-standing lesions, whether in the jaw bone or elsewhere. We point to the transparent area at the apex of a tooth in the radiograph of an ordinary abscess and state that the area is caused by pus. This may be true, but it must be remembered that it is not the pus, per se, that causes this radiographic demonstration; it is the liquefaction of bony tissue and its substitution by a cystic sac of pus of lesser density that makes the infection demonstrable. Early bone infections produce absolutely no recognizable changes in the bone which are demonstrable in the most critical radiographs. Pus is there but gross bone dissolution has not taken place. It requires days and usually more than a week for an infection acting on bone tissue to produce changes in the calcium structures of so gross a nature as to result in positive radiographic findings.

Some time ago I made some interesting observations on sawed sections of bone contiguous to gross abscesses in an autopsied case of generalized blastomycosis. Now blastomycosis is one of the most chronic granulomatous infections, and produces a very complete bone liquefaction by extension. In several of these sawed specimens of bone radiographs made under ideal conditions failed absolutely to show density differences in a considerable zone around the central liquefied abscess although this zone was visibly discolored and microscopically was the seat of active dissolution. This fact proves that in the early stages bone infections extend farther than can be demonstrated radiographically.

Many of you have also had the experience that in an early tooth infection normal radiographs were obtained. This interpretation should not lead one to infer that no infection exists. It is merely an unfortunate fact. In the absence of radiographic findings the case must be treated on other indications. Only too often an early incision is postponed and a systemic reaction results from an absorption of pus under tension just as in the case of an acute infectious osteomyelitis in the hands of a general surgeon. I have seen three cases of acute osteomyelitis die because negative X-ray findings in the upper humerus were allowed to confuse the diagnosis, which clinically was conclusive, and operation deferred until too late.

Now let us consider the converse of this proposition. At the onset the radiographic findings lag behind the clinical symptoms. When the infection subsides the X-ray may show a considerable absorbed area which does not represent this amount or degree of disease. It takes a definite longer time after the active disease has subsided for nature to repair the defect and reconstruct to fill in the necrosed area. The X-ray is therefore of little use in deciding the disease has been eradicated from the apex of a tooth to the extent where the canals can again be safely closed.

I will not take more of your time except to emphasize the necessity for the use of X-rays in the diagnosis of occult alveolar abscess and to join which Dr. Raper in the hope that by its use in dental schools and in dental practice the public at large will be afflicted with much less trouble from root infections in the next generation than they have in the past.

DR. E. D. COOLIDGE:

The discussion that has just taken place has been mostly along the line of infection which I am very glad to have heard from a man so capable of speaking of that side of X-ray work as is Dr. Potter. Before I leave this phase of the subject, I want to show a slide taken in a case of acute abscess where it does not show any liquefaction.

The part of the paper I want to confine my remarks to is that in which the X-ray applies to better dentistry. We all know that to-day dentistry has a much broader outlook than it ever had before; that the investigations of recent years have

broadened and intensified the importance of operations in dentistry which used to be considered with more or less indifference and were often hurriedly and sometimes carelessly done.

We have been much interested in following the work that has been done along this line, especially that by Dr. Rosenow in his investigations. He has told us of many conditions caused by infection due to improper technic, improper root fillings, and uncured pyorrhea. We did not realize the extent of the dangers from these conditions. We realize now that dentistry is a part of medicine. It is preventive medicine. Every time a patient places himself in our hands we attempt to treat the teeth. Should we send him away with the teeth improperly filled, half filled, or filled under conditions which invite abscess formation, we are not doing ourselves justice and we are certainly not doing our duty to the public. A condition that may not have any external evidence, that may not cause a patient any pain, may be causing that patient's death slowly, and such a consequence we have heretofore never considered. We cannot depend upon the patient to point these things out to us because of the pain they cause or because of swelling or inconvenience. We can find out these things only by such means as has been demonstrated here tonight.

Another thing mentioned was in reference to extracting teeth without cause. There used to be complaint that teeth were ruthlessly extracted; that it was not necessary to extract many of them that were extracted; that the dentists who extracted teeth ruthlessly and put in plates were doing a great injustice to their patients. A great many teeth have been sacrificed in the past that probably would be saved today under similar conditions. The pendulum has swung the other way too far, and now we are saving teeth which had better be extracted. We often criticize those who advocate the extraction of teeth that seem to be giving good service. We hear of these things, and we hear of the recommendation of physicians and dentists to have teeth extracted which a conservative man thinks ought not to be extracted. Somewhere between those two sides of whether the teeth should be saved or extracted lies the safest course to pursue, and perhaps the future will determine what is right. Perhaps it is neither extreme. We must attempt to determine whether a tooth can be saved with safety to the patient.

Now that these things have been pointed out to us by the X-ray, we should apply greater care in our work. We should strive for greater cleanliness and more care in preserving and maintaining asepsis during the entire operation. It seems to me, it is next to criminal for us to go on with methods which are not careful in this kind of work.

Dr. Rosenow, a few nights ago, in a lecture remarked that one of the most successful places for getting a culture is at the apex of a root canal filled with infected filling material in a nice warm place in the tissues. If we are to fill root canals perfectly, and do not fill them under the strictest aseptic precautions, we are only making a bad mess out of it. There are two requirements necessary to make better dentistry, one of which is greater care in perfecting our technic, and the other is greater care in maintaining asepsis.

One of the greatest uses of the X-ray is in diagnosing conditions which we have no other means of finding out. Probably either of the two gentlemen who have spoken on the subject could have kept us here all night in talking about things which we have not been able to find except by the X-ray. We can find pyorrhea, but seldom can we find abscesses which are not causing pain to the patient without the use of the X-ray. We can never treat a patient properly whose jaws have not been X-rayed, who has a number of teeth, the roots of which are filled. It is impossible for us to do work on the roots of teeth which have been treated previously and assure the patient that there will be comfort and health unless we know what kind of root fillings there are in those teeth. If a tooth is infected we cannot see it, but we can determine whether the filling is perfect or not and observe the conditions of the tissue about the root apex by the X-ray. Every pulpless tooth worked upon should be X-rayed before the work is completed and the record of the case preserved.

To wait for physicians to diagnose our cases for us is only a reflection on our own ability. I believe we should let nothing stand in the way of making our own diagnosis of cases in our own field of work. I believe the physician should help us. It is a credit to any dentist to have the confidence of medical men and to have a patient referred to him by a physician. It is not right, however, to treat patients and then have them referred back to

us by the physician because the work we did has resulted in abscesses due to poor technic which has caused serious systematic disorders. If our technic is poor we have a means of finding it out. It is our duty to find it out before we dismiss the patient.

The danger of misinterpreting skigrams is great and grave. I have seen several cases where great injury would have been done to the patient if the X-ray findings had been interpreted as an abscess, because they were only the shadow of some foramen or bone cavity. This should always be kept in mind.

Another place where the X-ray can be used in dentistry in treating root canals is in determining the direction of the roots. Often the roots of molars especially are crooked, the roots of bicuspidis are frequently small and difficult to locate. It is not only true of those teeth, but of others which we have often found. The X-ray will show the direction of the roots. If it is a good, clear picture it will usually show the canal in the entire root unless it is filled in with secondary dentin. This is of decided advantage to the operator. If broaches are put into the canals of a molar tooth or any other tooth, and there is uncertainty of reaching the entire length of the root, the X-ray will show whether the broach goes to the apex or not. I believe in all cases this should be done where the roots are being treated.

Dr. Raper said that any man who claims to fill all root canals you should never hope to hear from again. That is very true. We know it is impossible to fill all roots perfectly, and the X-ray is one of the best ways of telling us why it cannot be done.

In a case I will show you, it would have been impossible to have found the canal had I not made use of the X-ray.

The examination of root canal fillings before a patient leaves the office is important in all cases. They should be X-rayed regardless of our ability to fill the roots and the care we exercise in filling them. The man does not live who can fill the canals of all teeth as he wants them to be, and if you were to X-ray every one of them two or three times you would find you had not done so.

Another thing the X-ray will do for us is to help us to study the pathologic tissues around the end of roots. The question arises, is it going to be necessary to extract every tooth or

amputate every root that has an abscess on it? After five years' experience we will be able to answer that question more intelligently. If the X-ray can show the absence of liquified tissue there and density quite equal to the normal bone all around the root, we would naturally suppose the abscess had filled in and the condition was normal again.

Think of the value of having an X-ray record of every root filling, of every pyorrhea pocket treated, as the patient returns to you from year to year. In treating pyorrhea nothing is more convincing to both the dentist and patient than to show the condition has disappeared from the picture, and I am sure nothing could be more gratifying than to turn to one's record and find a record of perfect root canal fillings when a patient comes back to have an inlay put in or to have a crown put on where a tooth breaks off.

Dr. Raper said that according to the best of our present knowledge, if the teeth of a patient are properly treated they do not have abscesses. I believe that is right, and yet a great per cent of teeth are not properly treated.

Another point he brought out was with reference to a publicity campaign for preventive work. Prevention, of course, is the greatest treatment we can give in any case. If we can teach people to prevent cavity formation in teeth we do better than filling these cavities. If it is possible for Dr. Goslee or others to develop a system of bridge work to give patients service without devitalizing the teeth, it will be a great step toward preventive pulp treatment for bridge work, and I hope it can be done. In some cases perhaps it can.

(Dr. Coolidge then exhibited some slides showing the condition of several cases that had come under his observation.)

DR. J. H. WOOLLEY:

My purpose in joining in this discussion is not to bring any discredit upon radiography, but to call special attention to one phase of this science that has unfortunately caused some serious results in its use, particularly to some patients who seem more susceptible than others to the deleterious effects of exposure to the X-ray.

With that motive, I would ask the essayist to explain what may be the cause of the bad effects that have been observed and

cannot be ignored. Is it the kind of apparatus used? Do different makes of tubes diffuse different qualities of the X-ray, some of which act upon the subject as a poison having a distinct pathological effect?

Is not the Crook's tube or X-ray light analogous to the spectrum lights from the sun wherein there is a division of light into separate wave lengths, producing the separate colors? Experiments upon plant life show that some of the spectrum rays act in a deleterious manner, blighting the plant life, while others, such as the actinic rays nurture the plant, even causing accelerated growth.

In an opinion expressed by the former Dean of Bellevue Hospital, he made the statement that Dr. Cole was the best living authority on radiography. That he made very careful and extensive experiments on guinea pigs, in the course of which he found that some tubes caused toxic effects, while certain other kinds of Crook's tubes, of certain manufacture, were harmless.

This brings me to an office experience. Feeling the need of my patient having an X-ray examination, I suggested it to him and he very promptly refused, saying that he would give me his reasons for the refusal at some future time. This he did in the form of a letter to me. I don't want to throw any bombs to discourage the X-ray use, but I do think we ought to know more of what we use, and the formula or specifications therefor, the same as we insist upon doing in medicine or in dental instrumentation.

I have used, and shall continue to use, many X-ray pictures, as I find them very useful and in some cases quite indispensable, but I do wish to know more about the subject and to know when I can use it safely.

I will now read the letter, allowing it to speak for itself, and only saying that I vouch for the truthfulness of the writer:

Chicago, March 16, 1915.

Dr. J. H. Woolley, Chicago.

Dear Sir: The other day when you inquired of me my reason for refusing to have an X-ray taken of my jaw, neither time nor opportunity offered the chance, and not wishing to appear either awkward, obstinate, or unreasonable, in a matter which may to you seem an everyday transaction, I take the

liberty of addressing these few remarks, giving my experiences with the X-ray and my study of the subject following my experiences, and will leave it to you whether my reasons are not amply sufficient to justify me in refusing to submit to an X-ray examination.

I am aware of the inclination present, I am sorry to say, in a majority of professional operators to use any means at hand in times of stress and uncertainty which may promise light on, or the solution of, perplexing problems, and this, too, without taking heed to the possible, I might add almost probable consequences to the unsuspecting, trusting, and confiding subject commonly called a patient. What I purpose saying here is to advise you that while your experience might lead you to a contrary view, nevertheless that others have had a widely different experience with very serious results, in order that in the future you may advise more intelligently and act with the knowledge that there is always present the chance of serious injury to a patient of yours whom you may request, as you did me, to go to an X-ray man and have a picture taken in order that you might the more readily and satisfactorily diagnose a complaint.

It seems to me preferable that one occupying the position of dentist, physician or surgeon, should use established means to handle dangerous situations rather than take on some new and untried means that has the possibility of very serious injury if used.

Some years ago my father, then a man of some seventy years, had an accident in which he was supposed to have fractured his hip. The surgeons said the bone in the hip socket was broken, and to determine the nature of the break and after the patient had commenced to walk, sent him to an X-ray expert to have a skiagraph taken. Being a large man, two exposures were required before a satisfactory plate was secured. The operator who took the pictures—a prominent X-ray man—still practices his profession in this city and is no doubt saying to each one of his patients who may have the caution to inquire as to whether any ill-effects may attend the picture taking, as did my father, that there is absolutely no danger whatever attendant upon the taking of an X-ray picture; nevertheless and notwithstanding the assurances which he gave that there was no chance whatever for injury, my father, about six weeks later, developed an X-ray burn on the right side of the bowels, which

remained with him until his death in May of last year, a running sore all of that time, a period of over ten years. My experience during those ten years will never be forgotten. The skin and flesh to the extent of about 7x10 inches decayed and dropped away and in the course of about three years was replaced, excepting a patch the size of a silver dollar which never healed, by a hard white glazed scarred tissue streaked with red to which apparently and according to the best diagnosticians, the intestines attached and afterwards tortured the victim throughout the entire process of digestion and elimination. While physicians in attendance were doing everything known to them to heal the wound, I went in quest of information concerning X-ray burns, the cause and the remedy, in the hope that something could be found to give relief. After penetrating the mystery of the code of ethics of experimenters with X-ray machines in Chicago and getting beyond the curtain, as it were, I found that every man, without exception, who had fooled with the X-ray machines had his victims, and they were not few. I found that the injuries embraced nearly every portion of the human anatomy where the ray could be applied. I met with one that had lost an ear, another with a hole in his back, one woman whose breast had been burned off and who died before relief could be given, another whose jaw was burned so that she lost part of her face and the lower lobe of one of her ears; but nowhere did I find the cause nor the remedy. I then took the train for New York and called upon the Dean of Bellevue Hospital, to whom I related my troubles. He gave me the name of the Roosevelt Hospital, near Central Park, in New York, and the physician then in charge of the X-ray department, if I remember correctly, Dr. Cole, by name, and said that he considered Dr. Cole the best posted and most experienced man in that line in the United States, if not in the world, and that if I could gain any information upon a subject which he considered very much in darkness, I could get it from Dr. Cole. I visited Dr. Cole in his office in the hospital and found an immediate response to my anxiety. The doctor, as he explained to me, was at that very time experiencing some of the unpleasant effects of his too frequent use of the X-ray machine, not in applications of the ray directly to himself, but in handling the machine and the tubes in making experiments upon guinea pigs and other animals to ascertain the effect of the different rays as

diffused over his subject by the different tubes then being used. He said that he was endeavoring to find out what it was that caused the X-ray burn, why it burned, and what would heal it when once it had developed. He was searching for the truth, not alone for the sake of finding the truth, but spurred on by the necessity to find for himself a remedy. I gave heed to his every word and in the two hours I spent with him I gained more valuable information concerning the subject of X-ray machines, and their burns than the average man will get in a lifetime of ordinary experience, and sufficient to enable me to decide, without a moment's hesitation, that there is no inducement sufficiently strong and known to me at this time which, if offered, would induce me to hazard the risk of an X-ray picture.

You say that you inquired of the X-ray man who did the work for your patients whether he had ever had any ill effects attending his operations, and that he had answered you that he had not. That is not as conclusive as it might appear at first hand. Unless some of the physicians in charge of my father informed the X-ray man who took his picture, of the result of the taking of that picture which resulted so disastrously, he is today ignorant of the result. It is possible that others who have been injured may have acted in like manner.

The X-ray burn does not develop at once, in fact, it will not present itself in most cases until after the expiration of a month, and has been known to linger in hiding for six months before coming to the surface. I have in mind one case that was some five months in developing. Doctors have not always known what caused the sore and the X-ray incident may have been forgotten or overlooked by the patient, but I venture the assertion that if you were to give me the name of your X-ray man and I cared to devote the necessary time to it, that I could establish, beyond the peradventure of a doubt, that he had burned not one, but several.

In the interview I learned from Dr. Cole that his experiments had taught him that there were certain tubes then being manufactured—I think they were green in color—which produced burns whenever used, no matter how short the exposure, and the depth and extent of the burn increased with the running of the time of the exposure. I think it is but fair to the layman who has not had the opportunity of acquiring the specific which I have in this mat-

ter, that professional men like yourself, called upon to treat the unsuspecting public, should look into these matters and have specific knowledge and see to it that your patient is not subjected to the hazards that it has fallen to my lot to experience, because the professional man in charge either did not know what might result to my father or neglected or unlawfully refused to divulge the knowledge which he did have.

I am inclined to believe that most professional men would hesitate and ponder a long time before running the risk of an X-ray burn if they knew that such a thing were possible, and with this veil of charity for the mistakes which have been made and in the hope that I may lead at least one professional man to investigate seriously the subject of the X-ray before he prescribes it to another patient, I have penned these lines.

If what I have said is not, in your opinion, sufficient to justify my refusal to submit to an X-ray operator, I can add some other reasons. But to my mind, what I have already said is ample. I am pleased to add that I do not believe the X-ray to be indispensable in most cases, in fact, in my case you succeeded admirably without the X-ray machine, and I think, in a very great many cases, others could do likewise and not run any risk whatever.

Yours very truly,

JUSTUS CHANCELLOR.

DR. RAPER (closing the discussion) :

Regarding the deleterious action of the X-rays, I have never heard of any bad effect from the exposure necessary to make a dental radiograph, nor do I think anyone else has. It would be dangerous to take a grain of strychnia at a dose, but if you should take one-sixtieth of a grain it would not be dangerous. The same reasoning applies to the dose of X-radiation. When making dental radiographs the patient is not taking a sufficiently powerful dose of the X-rays to produce dermatitis. X-ray burns occurred in the days when radiographers did not know much about the dose of the X-ray and when, with the X-ray machines then in use, it was necessary to expose patients many minutes for radiographs which can be made in seconds today. In a general way, there is no difference between X-ray tubes. As to the green tube causing a burn: all X-ray tubes, excepting the Coolidge tubes, produce a green color.

I like the attitude Dr. Woolley has taken because he warns us to be careful. Nor do I blame the patient for his attitude, but I would say, no, his reasons for refusing to have a radiograph made are not good; they are sincere, but not good. He does not tell us how long his father, who was injured by the X-rays, was exposed to them, but I wager it was *at least* one hundred times as long as it takes to make a dental radiograph with a modern machine.

This man who has had one of the disasters of the early use of the X-rays seared into his mind tells us that radiographers themselves have suffered from the effects of the X-rays. What he says is true; radiographers have suffered and died from the effects of the X-rays, but these men worked unprotected, not knowing protection was necessary. A lead screen offers full protection, and any radiographer who works without one is, it seems to me, very foolish.

The lead screen is the solution for protection for the operator, for by its use he is shielded from any direct radiation. But how about the patient? You can safely expose a patient for two minutes. You can expose longer than that, but any one who develops an X-ray dermatitis from an exposure of two minutes is an individual with a very definite idiosyncrasy to the action of the X-rays. The risk run in having a radiograph taken is not to be compared with the risk of running an automobile. Does that answer your question, Dr. Woolley?

DR. WOOLLEY:

I suppose a good deal of the danger comes from the length of time a patient is exposed to the X-ray; but have you determined by research work whether the tubes throw off in the diffusion of the rays of light poisonous matter that will act upon the tissues? Has that subject been investigated?

DR. RAPER:

Yes. The subject has been investigated. The X-rays themselves are responsible for X-ray dermatitis. Human vision is limited to the light of the spectrum, to light rays which vibrate between four hundred billion (red) and seven hundred and fifty billion (violet) per second. X-rays are probably a form of light waves vibrating at a much higher rate than violet, or even ultra violet rays. They are nevertheless probably a form of light, and it is an interest-

ing fact that the symptoms of X-ray dermatitis, in some of its forms, are not unlike those of sun-burn.

DR. WOOLLEY :

Can you explain to me why Dr. Cole found out in his clinical work that by experimenting on guinea pigs with different kinds of tubes he found certain tubes caused a diseased condition, while others did not?

DR. RAPER :

I cannot explain that; but I repeat, that with the exception of the new Coolidge tube which involves a new principle, all X-ray tubes are practically alike.

In conclusion: Remember this as the most important thing I have said. The radiograph is teaching us the importance of filling teeth before they ache—before pulp canal work becomes necessary. Let us not be slow in passing the knowledge on to the public.

Dr. H. C. Waack read a paper entitled "Silicate Cements and Their Possibilities."

DISCUSSION.

DR. C. E. JONES :

I feel quite unprepared to discuss Dr. Waack's splendid paper for the reason that I did not have an opportunity of reading the paper until just previous to the opening of this evening's meeting. My remarks will, of necessity, be confined to an emphasis of the possibility of making our silicious cements less soluble by the process of a thorough but somewhat different spatulation from that heretofore advised by the manufacturers of these cement ingredients, and to the care that should be observed in the preservation of the ingredients and subsequent handling in their mixed form. The essayist has limited his able but concise contribution to a description of his deductions made after an extended use of this newest of filling materials.

The essayist has made use of the term "silicate" when referring to either the product of the manufacturer or to the mixed ingredients in cement form. It is to this particular and frequent error in the naming of these cements that I wish to call your attention. The finely ground powdered portion of these cement ingredients, as prepared for our use, should be known as a silicate, because they are true silicates, as well as aluminates, and are formed at high fusion in the manufacturing process.

While the term "silicate cement" seems to encompass our understanding of the relative characteristics of cements of the type under discussion, it would seem quite in place to here specify by what term some men, whose knowledge of the chemical arrangement of the elements contained in such products, believe a compound of this type should be called.

The tendency of the manufacturer to disguise his product with such misleading terms as "synthetic porcelain" and other ambiguous names has led because of our rather comprehensive interpretation of the meaning of the term porcelain, to an incorrect understanding of the composition of the materials in these cements. We should decry the use of names that misrepresent the character of these products.

The dental chemist has had in the preparation of the ingredients of a silicious cement one of the most difficult of tasks. He has been called upon to produce a substance dissimilar in character to any other product in the cement line. He has been circumscribed, to a very limited field from which to draw the elements known to possess qualities necessary to fulfil the severe requirements demanded by the profession. And while I do not consider his work completed, I cannot refrain from here emphasizing the importance of his efforts in this particular field.

I do not think that any producer of cements of the type under discussion has made the claim that silicious cements are permanent in the light of our understanding of permanency as represented by gold as a filling material. Nor do I believe that the honest experience of any user of these cements would, up to this time, justify an assertion encompassing the significance a remark of this character would entail. In view of the fact that we are not dealing with a permanent material, as it is now used, and being of the belief that a much more permanent and durable silicious body may be prepared, by paying strict attention to our technic in handling these ingredients the following, somewhat impropu, discussion of the subject is offered.

If we can increase the durable and lasting properties of these cements by manipulative procedures, it is obvious that we should adopt every known means to bring about this end. Thus we will offset many of the disappointing results which we would otherwise experience.

If proper preservation of the ingredients; care in selecting shades; thorough and sufficient mixing; correct cavity preparation; proper insertion and finishing, along with subsequent protection from moisture coupled with care and judgment used in selecting the place for its use are things which will increase the permanency of these materials, it is quite apparent that they should be the important considerations included in our attempt at the successful handling of these restoring agents.

I take it that all of you have used silicious cements in rather an empirical way. This inference has been caused by the meagre amount of information we understand nearly all of the members of the profession have relative to the ingredients, formulas, etc., of these products. And while the problem before the manufacturer is a chemical one, it does not necessarily follow that the manipulation of the powdered silicates and the accompanying liquids means a continuation of extensive chemical process. That part remaining for the dentist to perform in the manipulation of cements is devoid of much chemical reaction. For example: The liquid of a cement is a solution of phosphoric acid loaded to almost saturation with modifiers. In fact there is such a small quantity of the phosphoric acid left free and uncombined that there are but few hydrogen (H) elements to displace when brought in contact with the basic elements of the powder that very little chemical reaction remains for the dentist to induce in the preparation of his mixes.

I am of the belief that the problem before the dentist, in the proper handling of cements, involves a thorough understanding of their physical characteristics or the chemical arrangement of their ingredients. It would seem, from my viewpoint, that if the user possessed enough information to carry into effect the instructions of a reliable manufacturer, together with the proper attention to detail, that he would be sufficiently well prepared to use successfully these newer forms of filling materials in so far as success may be attained with them.

There seems to be a degree of satisfaction, for all of us as displayed by our contentions about things of which we are ignorant. But I always feel that if a man knows literally just what he is doing or trying to do, that he will come nearer completing the task than if he occasionally staggers blindly upon an

accomplishment without really knowing just how he achieved the thing desired. I, therefore, believe that the elemental factors concerned in cement mixing should be understood, and with that end in view, I shall try to make clear just what I think transpires when a silicate powder and a cement liquid is brought together.

While I have a keen desire to deal with the subject of silicious cements from the standpoint of their physical properties alone, I do not believe that I shall impose discomfort upon you when it shall be found necessary to refer to chemical activities by way of substantiating contentions in the discussion, or to assist in elucidating points germane to the subject. I take it that the members of the profession are quite familiar with the various makes of silicious cements now offered by the many manufacturers under the various names, and when it shall become necessary, in this discussion, to make special reference to the product of any individual manufacturer, I am sure that you will at once understand that the application used signifies, in its reference, to a general class represented by a large family grouping known in their cemented or mixed forms either as *silicious or calcium phosphate* cements, in which the liquid is an aqueous solution of phosphoric acid and its modifiers, in the form of phosphates, and that, the portion known as the powder is a silicate substance containing Aluminum Oxid, Calcium Oxid, Silicon Dioxid, Phosphoric Pentoxid or a similar flux, in combination with such elements as Lithium, Berilium, etc., modified with rare earths and pigmented with metallic oxids.

It will seem, I know, quite presumptuous on my part for me to attempt to present views other than those held by the manufacturers of these cement ingredients, but I am compelled to do so in view of the results I have observed from rather a long line of laboratory experiments and clinical observations.

In the manufacture of these silicate substances, which subsequently become the powders of the cements, a very refractive substance of almost unknown chemical relations is produced, but the manufacturer has for his purpose the preparation of a material of practically insoluble properties. As a material is produced upon which an acid of the comparative avidity of phosphoric acid has no action, it becomes necessary to add an agent

which will permit of a reaction between an acid of this type and the silicate mass. Calcium is the agent used, and it therefore becomes the controlling factor.

The ingredients of a silicious cement, as has been before stated, consists in their unmixed state and as received from the manufacturer, of finely ground silicates and aluminates, and a liquid representing an aqueous solution of ortho-phosphoric acid and modifiers, in the form of aluminum, zinc or perhaps other phosphates. We might sum up our present understanding of a silicate powder by saying that it is a fused mass of basic oxids with silica, aluminum being the chief ingredients, and upon which is depended along with the phosphorous, for translucency. The calcium content is incorporated in excess, chemically, so as to permit of the ready action of an acid like phosphoric upon it to form a crystallizing, or agglomerating mass with subsequent basic hydration of the silicates by the water formed from the reaction of the acid upon the basic oxid.

Orthophosphoric acid, being tribasic, dissociates to form three kinds of salts. We would, therefore, expect to find calcium salts of either the primary, $\text{CaH}_4(\text{Po}_4)_2$ or the secondary, ${}_2\text{CaHPO}_4$; or the tertiary or normal variety $\text{Ca}_3(\text{Po}_4)_2$ in silicious cement mixes. Ostwald and others inform us that phosphoric acid dissociated into the radicals H and H_2Po_4 more frequently than in any other forms, we therefore would expect the radical dihydrogen phosphate to combine with a divalent metal or base to form a primary phosphate $\text{CaH}_4(\text{Po}_4)_2$ (monocalcium tetrahydrogen diphosphate) a salt known to be very soluble. The soluble part of a cement, or that part representing a phosphate salt—or the agglomerating mass or binder—is regulated by the extent of the action of the basic oxid of Calcium upon the trivalent phosphoric acid (H_3Po_4). To explain; if in bringing the modified aqueous solution of phosphoric acid (H_3Po_4) in juxtaposition with the calcium oxid, you permit and promote by spatulation of the entire displacement of the hydrogen radicals of the acid you have formed a normal or tertiary $\text{Ca}_3(\text{Po}_4)_2$ which is an insoluble salt and the cement mass will not disintegrate, but on the other hand where you bring into contact, without spatulation, the acid liquid and the powder a primary or most frequently a secondary salt is formed

empirically represented as CaHPO_4 which is quite soluble and which increases the instability of the cement or agglomerating portion of the mix.

While a combination of calcium and the group Po_4 in any one of the three possible salt forms may be quite insoluble, it is well known that the normal salt $\text{Ca}_3(\text{Po}_4)_2$ is least soluble of any. It, therefore, seems quite obvious that whenever possible this tertiary or normal salt should be formed, as has been previously stated in this discussion. Orthophosphoric Acid, (H_3Po_4) dissociates invariably into the ions H and H_2Po_4 . The divalent calcium element would, if brought into contact with but two molecules of the phosphoric acid, form $\text{Ca}(\text{H}_2\text{Po}_4)_2$ a primary or more soluble salt than the normal calcium phosphate.

It thus will be seen that the agglomerating mass, or that portion of the cement mix binding the admixture together, is most always composed of a soluble salt; that is, where no effort has been made to induce further dissociation than the primary stage of salt formation.

Since it is our desire to increase the permanency of these silicious mixes, when they are used as restorations of tooth structure it might be well for us to here consider by what means this permanency may be brought about.

Normal calcium phosphate, as has been stated, is practically insoluble in water. It is obvious therefore, that the normal salt is the most desirable. Let us then look for some method or way of transforming this soluble salt, primary calcium phosphate, into the more insoluble form, normal calcium phosphate. *It is known that insoluble calcium phosphate may be formed when it is admixed with a soluble calcium phosphate in solution.* If this known reaction can be depended upon, that is, with the procedures we expect to put in operation in the mixing of our cements, I am of the belief that we can nearly always make an insoluble agglomerating mass out of the product first produced when the phosphoric acid and basic calcium oxid is brought together by thorough and prolonged *SPATULATION*. The process of spatulation, acting as a mechanical means of bringing those portions, or combinations of the divalent calcium and dihydrogen phosphate into a sufficiently close physical relationship to permit and promote of further dissociation of the hydro-

gen atoms still remaining attached, or withheld in the primary or even secondary salt formations.

As it is our desire to have this normal phosphate formed, because of its insolubility and realizing that the heavy syrupy liquids, because of the low water content (in proportion to its dissolved ingredients) possess very little dissociating power, and thus fail to act as a suitable vehicle for carrying the basic calcium oxid in contact with the acid, I am led to suggest making the mixes upon a slab approximating 65° of temperature, bringing the powdered silicates in small proportions into contact with the liquid with the aim of producing a normal calcium salt, by dissociating the hydrogen ions of two molecules of phosphoric acid with three molecules of calcium; depending upon spatulation to dissociate the radicals instead of permitting a slower and not so complete reaction and which invariably results in the formation of an acid salt. The mechanical procedure of spatulation, we thus would expect to serve as would a liquid having high dissociating properties, and of increasing the encounters between the molecules of the reacting agents.

In order to impress you with the necessity of doing this operation of spatulation as suggested, I wish to here state that polybasic acids of the variety used in cement making are dissociated slowly and that each successive displacement of the combining weight of the hydrogen is done so with increasing difficulty; to illustrate this point, the first hydrogen displaced in the reaction between the tribasic phosphoric acid and the basic calcium ingredient of the silicate powder is produced with comparative ease and rapidity—calcium dihydrogen phosphate being the product—but when further dissociation is attempted a more difficult task is confronted, owing to the tendency of the divalent combination H_2Po_4 to remain closely united and difficult to dissociate. This phenomenon will help to explain why in hastily made mixes there is invariably formed, a primary or soluble salt of calcium, but that further dissociation can not be doubted. One or even both of the molecules of the hydrogen remaining in the monocalcium dihydrogen phosphate may be displaced, when this product in solution, and a secondary or tertiary salt of calcium formed by further spatulation or agitation, thus bringing the base calcium in contact with the divalent hydrogen

phosphate ion while the liquid of the mix is still able to act as a vehicle in carrying the elements into sufficiently close chemical relation to permit of an interchange of their radicals. The truth of this contention has been satisfactorily demonstrated by testing the character of the salts formed in various ways of spatulation and further in noticing the acid reaction in cements that had been mixed and permitted to set for a long time.

For the sake of describing the process by which an insoluble salt may be formed in our cement mixes and in hopes that you may have a better understanding of just what we mean when we suggest prolonged spatulation in the early part of the cement mixing, the following is offered: I believe it is customary for us to introduce the correct amount of powder into a mix of a two drop size in at least five or six divisions until we have induced a putty like consistency advised by the manufacturers of cements of this character. The line of procedure about to be suggested is no different from that already well-known to you except that comparatively small portions of the powder are drawn into the liquid during the early stages of the mixing process. If you are in the habit of drawing a considerable quantity of the powder into the liquid in the first one or two portions utilized in the mix, I would advise you to divide these portions, for a two drop mix, into at least six portions. The powder being light and fluffy is readily absorbed by the liquid, thus during the process of spatulation the six or more small divisions of the powder are readily taken up and the mix remains in a semi-liquid state. We continue to add small additions of the powder with considerable spatulation until the powder begins to assume a creamy consistency and that extreme glaze or gloss that is noticed over the surface of the mix is practically lost, owing to a neutralization of the phosphoric acid. This difference, in mixing, between the plan now generally followed and the one suggested only includes that portion of the process indulged in early in the mixing period. The portions of the silicate powder added late in the mix, in order to obtain physical consistency, are made in the same manner as now practiced. It is only during the early admixing of the cement ingredients, and before one or more combining weights of the hydrogen of the acid has been dissociated, that we can hope to induce the chemical change, through which an insoluble agglomerating mass may be formed.

It is true that the prolonged spatulation will retard the setting properties of the finished mix, first, by inducing a loss of heat, formed through chemical reaction, by radiation into the mixing slab, and second, by disturbance of the process of crystallization manifested during the initial or early period of the chemical combining of the elements of the cement. But tests have proved that the retardation induced in mechanically disturbing the reacting agents is of no appreciable length of time. It will be observed that the prolonged spatulation, providing the reaction leads up to the formation of a normal calcium phosphate, will induce complete neutralization of the acid content of the liquids—thus obviating irritations due to still active portions of the acid, likely to be contained in the mix after its insertion into the tooth cavity.

While the silicious mix may set slower owing to the loss of heat during spatulation and prevention of any gross chemical reaction after the material has been inserted, I do not believe, nor does any test I have been able to use in my experimenting, cause me to believe that the filling becomes more susceptible to the disturbing action of the extraneous water contained in saliva, and which may come in contact with the unset mass. On the contrary, I am led to believe that the silicious mass is less subject to the deleterious action of the water content of saliva than when hastily mixed and inserted while chemical changes are still active between the acid and basic oxids. This might be explained by stating that by thorough spatulation a sufficient amount of water is formed as a product of the reaction of the acid upon the base to permit of a proper balance in the water of constitution in the crystallizing mass, with subsequent slow hydration of the silicates as explained in another portion of this discussion.

Believing then that it is possible to most always produce a normal calcium phosphate by thoroughly spatulating those small portions first brought into mix, it is to this one feature of our procedure in the preparation of these cements, that I wish to particularly call your attention.

The mixing slab should be thick, etched, glass absolutely clean, and free from deep scratches. The spatula should best be agate, and one with a sufficiently long working blade to reach nearly across the slab; it should also be thin enough to permit

of transmitting a sense of feel at its working portion. The number of instruments for inserting the material should be ample and of suitable shapes and sizes; they may be of bone, agate, ivory, tantalum or any similar material. Steel should never be used for reasons you well know. If Berylite, or a similar silicate, that is known to have an energetic liquid or powder, or both, is to be used it will be well to cool the slab to as low a degree as atmospheric conditions will permit. The cold mixing slab becomes a necessity in those cements that heat quickly following chemical reaction between liquid and powder. The reduction of temperature may be appreciated when you are reminded of the fact that a raise of ten degrees F. in the temperature of the slab and cement ingredients thereon situated will increase the avidity of the acid 100%. It is also well known that a retarded chemical reaction in the mix will permit of greater incorporation of the cement powder. This may work a decided advantage in those cases where translucency is not desired, since a greater portion of the insoluble ingredients may be brought into the mix.

We are assuming that previous to making the mix you have arranged your instruments and accessories, such as matrices, etc. The colored variety of matrix serves best. Lavolin, vaseline, or any unctuous or oily substance for the purpose of lubricating and preventing adhesion of the cement to the surfaces of the matrix. Personally I like to use liquid lavolin. The matrix should be so attached that it will represent a rigid wall, against which to work and confine the plastic material. Pulp should be protected in deep seated cavities, by placing non-conductive agents between pulp and the silicious filling material. Pulp occasionally die under silicates, not so much due to any irritating action of the cement but due I think to encroachment upon pulp chambers without inducing an exposure as we would likely do in cavity preparations for gold.

The mix should be stiff enough, except in special instances, to permit forcible packing. The angles and undercuts should be first filled, followed by the insertion of a sufficient quantity of the cement to force that portion first placed laterally against the walls of the cavity and into definite position.

When the cavity has been filled to excess the matrix may

be brought into final position and the filling compressed and retained until a partial set, at least, has been secured. At no time should the pressure upon the matrix be relieved until the filling material is no longer likely to move.

One important thing in connection with the use of the matrix is to always keep the filling material and matrix undisturbed until a firm set has been permitted to take place. This means that the matrix should be well secured in position before beginning the insertion of cement. I am quite sure that insecure and early removals of the matrix cause more failures than any other feature of our faulty manipulation of this material.

After waiting at least ten minutes for the cement to partially crystallize the dam may be removed and the filling finished, with due regard to a desire to place all surfaces in a polished condition. This may be done with fine cuttle fish discs, or strips that have had incorporated in the grit, paraffin or some similar lubricant.

Wear by attrition seems to be the most frequent change occurring in cements of the variety under discussion, and since there is a possibility of minimizing the amount of loss in this respect, it might be well for us to here state that the greater the polish, the less surface exposed to attritional forces and the more lasting and durable will be the finished product. A rough or irregular filling presents immeasurably more surface to frictional and dissolving action than does the filling with smooth surfaces. The celluloid matrix seems to put an ideal finish on these fillings. On the occlusal surfaces a very thin piece of celluloid may be held in position and the filling burnished under it, spreading always with a burnishing-like motion toward the cavity margins. I have made sufficient experiments to at once determine in my mind that a filling which is kept well polished will outlast the one unpolished. This thing I have observed in fillings in the same mouth. It has been my custom to occasionally repolish the fillings when opportunity afforded. I have thus rendered a much more lasting service with these cements.

I know of nothing that the operator can do in working these cements that will so increase their durability as a high polish. High polish in this respect, means a series of fine scratches running in the same direction.

I have noted some disappointing results due to the subsequent discoloration that you see in the tooth structure after the filling has been inserted for some time. These discolorations will show only after the material is sufficiently hydrated to become translucent. This is due to the discolored dentin left in the cavity before the insertion of the filling. There are two ways of overcoming this, one is to dry the cavity with alcohol and wherever there is discoloration it will quickly show. Another way is to transilluminate the cavity and the discoloration will show in the tooth as the light shines through. Discoloration of dentin spoils a great deal of our silicious cement work. Another place where frequent failure is experienced is where these fillings are made in their contour to restore the contact point. The patient will return in a short time complaining of discomfort because of food packing beyond the contact point due to the wear by attritional action of the teeth and dissolving of the cement by the saliva. I have in order to overcome this difficulty embedded at this point a little round rod of porcelain with an exposed oval end which establishes an indestructible and permanent contact point.

DR. RALPH W. PARKER:

I think we should all be grateful to Dr. Waack tonight because he brings to us such a favorable report of his experience with silicious cement after a careful use extending over a period of more than four years, and in approximately 4,500 operations.

While I have never made the effort to determine how many silicious cement fillings for which I must answer, my own personal experience dates back to 1908; an experience which, though beset with some disappointments and some ignominious failures, always measured up enough results satisfactory to keep me at it. At no time have I discarded the silicious cement, and with its gradual improvement by the manufacturer, and the elimination of its earlier objectionable features, there has come more satisfactory and permanent results, and much pleasure in its use.

It is idle to hope that we may get away altogether from the use of gold foil fillings in the visible surfaces of the anterior teeth, we perhaps do not want to do so; and just as idle to expect to cease altogether the baking of porcelain inlays, yet we must all

agree with the statement made by the essayist in the first paragraph of his paper, that today our patients demand that we disguise as much as possible the evidence of our operations. None of us likes the appearance of gold, and how many porcelain inlays, alas, have we seen whose margins in a few years develop an unsightly dark line following the outline of the inlay and cavity.

I am firmly of the belief that today, with our silicious cements in their present state of perfection, we have a filling material, which we may add to our list, and which has advantages that neither gold nor porcelain has, provided the greatest care and pains as to detail be carried out in the manipulation.

I do not agree with the statement which the essayist makes in his paper, that the "manipulation of silicious cements requires no special skill," nor do I believe that Dr. Waack intended making any such statement, unless by "manipulation" he means "mixing."

It is my firm conviction that a dentist who cannot put in a gold-foil filling which will pass muster, or who cannot put in a measurably perfect porcelain inlay, will not get the uniform perfect results from the use of silicious cements.

The whole operation from start to finish is one of careful detail as to cavity preparation, dryness during filling, absolute cleanliness of slab, spatula and instruments, temperature of slab, selection of proper colors, mixing, and packing of filling and finishing of same. If any dentist will take up the silicious cement with a determination to use it conservatively and with painstaking care, and will make up his mind to read carefully and follow out the instructions given for his guidance by the manufacturer, I feel he will surely succeed with it and get results which will please alike his patients and himself.

My experience leads me to believe that Dr. Waack is a little too conservative, perhaps, in his judgment as to the class of cavities to which the silicious cements are best adapted, that is, he is a little too conservative, it seems to me, as to the limitations for its use.

While cavities in the gingival third of the incisors, cuspids and bicuspid, and proximal cavities in the incisors and cuspids, not involving the incisal angles, are, as a general rule, the ones

in which silicious cements are used to the best advantage, I will suggest, if I may, to anyone having the fear that any sort of a contour or restoration, especially of the incisors, would be a dangerous procedure, that he try making some such restorations, first in molars and bicuspid in which the restorations can be bulky, and after gaining some assurance from watching these, to try the restoration of an angle in a bulky cuspid or central incisor.

In simple occlusal cavities in molars and bicuspid because of the four surrounding walls, there is no contra-indication for the use of silicious cements. Only a few days ago it was my pleasure to again see seven such fillings, placed more than six years ago—all in fine condition—no discoloration—no marginal decay, and only the least appreciable bit of abrasion. In the simple occlusal cavities of the youngster's permanent teeth where we suspect later may follow proximal decays, we may safely use the silicious cements.

The gold inlay has its place, likewise the porcelain inlay, the gold-foil filling, the amalgams and the cements, but just as surely has the silicious cement comes into its own, and to stay.

DR. WAACK (closing the discussion):

There is very little for me to add. I will say, however, I am glad that Dr. Parker thinks me too conservative as I believe the greatest danger that confronts us at the present time with reference to the use of silicate cement, is indiscretion in selecting cavities that are suitable for its use. I do not think the silicates strong enough for contour work, or in cavities where stress of mastication is to be reckoned with. I do not believe we will ever have a filling material that will fully take the place of gold in those classes of cavities.

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EDITORIAL.

THE COMING MEETINGS AT SAN FRANCISCO.

The chief center of attraction for those interested in association work this summer will be San Francisco. All the important national meetings are to be held there, and of course the Panama-Pacific Dental Congress, preparation for which has been under way for several years. The program, which is printed on another page, speaks for itself, and so far as the entertainment is concerned it is only necessary to refer to the fact that the meeting is to be held at San Francisco. The reputation of the profession on the Coast is such that it is a foregone conclusion that all who attend these meetings will be well cared for. It is some years since an international congress was held in America and the time seems ripe for such a meeting. We need a crystallization of all the recent thought and new ideas which have developed since the last Congress, and we need the impetus and surge which only a large meeting can produce. The men of the Coast have worked faithfully and constantly to make the meeting a success, and the preliminary organization is such that the only thing necessary to consummate the effort is a large attendance from the other sections of the country. We are promised that the transportation facilities will be ample and that the comfort of those traveling to and from the meeting will be assured.

Let the dental profession show San Francisco that it appreciates her efforts in this undertaking by attending the meeting in large numbers, and to this end let each one from this time forward use his influence to induce his friends to go, and resolve to go himself.

Let us take San Francisco by storm on August 30th—a friendly siege, calculated only to foster goodfellowship and forward the march of science. On to San Francisco!

BOOK REVIEWS.

ALVEOLODENTAL PYORRHEA. By Charles C. Bass, M.D., Professor of Experimental Medicine, and Foster M. Johns, M.D., Instructor in the Laboratories of Clinical Medicine at the Tulane University Medical College, New Orleans, La. Octavo volume of 167 pages, with 42 illustrations. Philadelphia and London: W. B. Saunders Company, 1915. Cloth, \$2.50 net.

Whether or not the much heralded emetin treatment for pyorrhea will prove as great a panacea as its originators seem to think, this book will prove of the most intense interest to the profession at this time. The authors, next to Smith and Barrett, have been the most pronounced advocates of emetin as a specific in the treatment of this disease, and in some respects their claims are even more emphatic and unreserved than those of the men who first called attention to it. While the practicing dentist of many years of observation of pyorrhea will scarcely agree with some of the deductions of the authors of this book, yet no man can afford not to read it carefully and study the theories advanced therein. If the clearly stated assumption that the endameba is the specific cause of pyorrhea is correct, then the authors are surely on the right track, and their book will prove of inestimable value to humanity. The only way to prove this matter is for the profession to read the book and test the theories in actual practice.

THE PRINCIPLES OF BACTERIOLOGY. A Practical Manual for Students and Physicians. By A. C. Abbott, M.D., Professor of Hygiene and Bacteriology and Director of the Laboratory of Hygiene, University of Pennsylvania, 12mo, 650 pages, with 113 illustration, 28 in colors. Cloth, \$2.75 net. Lea & Febiger, Publishers, Philadelphia and New York, 1915.

Abbott's Bacteriology has become so well known that it is necessary to do little else than to announce a new edition—this one being the ninth. This does not mean that it is in any sense a mere repetition of the previous editions. Much revision has been done

to bring the work down to the most modern conception of bacteriological science, this being necessary in view of the fact that the subject of bacteriology is looming higher and higher on the pathological horizon. This is well illustrated in the author's reference to "Prophylactic Vaccination," in which he refers particularly to the practical elimination of typhoid fever from the United States army through the agency of vaccination.

The book is most interesting throughout and should be in the hands of every student of bacteriology.

DORLAND'S AMERICAN POCKET MEDICAL DICTIONARY. Edited by W. A. Newman Dorland, M.D., editor "American Illustrated Medical Dictionary." Ninth edition revised and enlarged. 32mo of 691 pages, Philadelphia and London: W. B. Saunders Company, 1915. Flexible leather, gold edges. Plain, \$1.00 net; Thumb index; \$1.25 net.

This is a convenient flexible little dictionary, which for all ordinary purposes is sufficiently comprehensive. It has been brought down to date, and the best recommendation it could have is that more than 70,000 copies of previous editions have been sold, which is sufficient evidence that the present volume will be popular. The book is somewhat enlarged over previous issues, but it is still compact enough to come well under the head of its title—a pocket dictionary.

PRACTICAL HINTS.

Edited by J. E. Schaefer, D. D. S.

(This department is for busy readers. We want short articles containing practical hints—the shorter the better. No article must exceed 200 words, unless of exceptional merit. Every dentist has some useful hint that has been of value to him, and if he will only put it in print it may be of equal value to others. That is what this department is for. Due credit will be given for every article sent. Address J. E. Schaefer, 1745 W. Harrison St., Chicago, Ill.)

The Roach Attachment:—Of the various forms of manufactured attachments I believe the ball and tube form—the "Roach attachment," to be the best. There is no form of attachment in use today that has the numerous advantages that has this attachment, and yet many men have failed because they seemingly did not know

how to use it. The ball should be soldered to the crown or inlay—do not cast onto it. The small end of the shank of the ball part should either be cut off or a hole drilled into the crown or inlay to allow this constricted part to go entirely into the crown or inlay and then be securely soldered to place as near the gingival as is consistent with the soft tissues—usually somewhat lingually of the center on the mesial or distal surface—it should never project lingually. The tube must always be soldered to its support, use 18k. solder; never cast onto it. Clasp metal wire or plate is best for this purpose, which may project into the vulcanite or be soldered to a metal base.—*G. W. Dittmar, D. D. S., Chicago, Ill.*

Supplying Missing Teeth:—It is my belief that a large per cent of the cases that come to us for this class of service call for a combination of splints, fixed bridgework and partial plates. One of the common mistakes that is made is the dependence upon either one or the other of these methods alone, rather than a combination of two or more. Rarely is it possible to meet the requirements in supplying missing teeth in mouths where there is a predisposition to pyorrhea with either fixed or removable appliances alone. Our plans should be so made that the minimum mutilation of the natural teeth will be required and yet when the conditions are such that the mutilation of several teeth is necessary to accomplish the fixation and support of one or more teeth, and to put the mouth generally in better condition, we should not hesitate to do so. We must consider the mouth and teeth as a unit and not individually. So that the question of conservation of the remaining natural teeth when partial artificial dentures of all sorts are being supplied is indeed a serious one.—*F. E. Roach, D. D. S., Chicago, Ill.*

The Interproximal Space:—The preservation of nearly normal interproximal space is of very great importance to the health of both hard and soft tissues. Its loss at first means thin attenuated gum septums followed by inflammation, absorption and pus. Proximal decays on the surfaces of the proximate teeth also occur, generally to the gingival of the contact wherever it may be; often penetrating the cementum and progressing rapidly toward the pulp without much external opening. To make the proximal surface of the tooth immune to caries under the gum septum, the gum must be

healthy. To be healthy it must be in some bulk so that its summit is supported by a strong foundation of alveolar process and elastic tissue. A thick wide gum septum is tough, resistant and not easily injured.—*Chas. Woodbury, D. D. S., Council Bluffs, Ia.*

Correction of Occlusion in Cleft Palate Case, Using Gilmore

Attachments:—History of the case: Born with cleft palate and hare lip. Cleft closed and lip united by operation at the age of 4 years. Since then had been neglected. At the age of 25 years the third molars are the only teeth occluding, with wide opening between the anterior upper and lower teeth, and the upper arch very constricted, with many putrescent roots, and a very bad odor, due to catarrhal condition of the mucous membrane of the oral and nasal passages.

Treatment—Extracted all bad roots and useless teeth. Devitalized the remaining teeth and filled their roots, then cut them off even with the gums and fitted tight-fitting gold caps, with 14 gauge wire bars for Gilmore attachments on the two posterior and on the central incisor caps—then made a rubber denture with three Gilmore attachments—the two posterior attachments to offset the tipping or dropping down of the posterior portion of the denture when biting, and the anterior attachment to offset the pressure downward of the upper lip (which was largely made up of cicatricial tissue), setting the teeth so as to restore occlusion with the lower teeth, building out the vulcanite so as to restore the normal position to cheeks and upper lip. The denture may be removed for cleaning.

Result—The most highly pleased patient you ever saw. He can now eat and properly masticate his food for the first time in his life. The catarrhal condition is all cleared up and the bad odor gone completely. Appearance greatly improved.—*J. T. McCallum, D. D. S., Chicago, Ill.*

Another Advantage in the Use of Formocresol in Root Canals:—It is a lamentable fact, that it is not possible to remove each and every particle of pulp tissue of putrescent pulps or pulps primarily alive and devitalized by arsenic. Whenever one of those cases presents where the complete removal of the apical pulp tissue is made impossible the use of formocresol is, I might say, imperative. For it will do what no other drug or combination of

drugs will do—namely, to convert those little pulpfilaments into a crumbled fibre, *which is absolutely sterile*. Any root canal which has been treated with formocresol for the proper length of time will be found sterile regardless of the fact that you are unable to remove all of its contents. You may fill such a root canal without being constantly worried over the thought that some undiscovered pulp remnant may bring about a periapical abscess.—*R. Schuhmann, D. D. S., Chicago, Ill.*

Extracting Badly Broken Down Molars:—Take a cross cut fissure bur and separate your roots. In the upper molars cut mesio-distally, then bucco-lingually. In the lower molars cut bucco-lingually and extract your roots separately.

You will produce less trauma to the surrounding tissue, repair will take place in a shorter time, and it simplifies extraction to the minimum, especially when the roots diverge greatly or the roots are curved. If extraction is to take place under a general anesthetic I paint my field of operation with the tincture of iodine, then proceed to separate the roots. When completed I then administer the anesthetic. If local anesthetic is used I first inject and by the time the roots are separated the parts are well anesthetized.—*Fred F. Schwartz, D. D. S., Chicago, Ill.*

Masticating Tough Meat:—Why cannot those wearing artificial dentures, except in very favorable conditions, masticate tough meat? Simply because the tough meat needs grinding and this is not possible.

The three point contact cuts no figure.—*L. P. Haskell, Chicago.*

Indirect Method of Inlay Making:—It has been thoroughly demonstrated beyond a doubt that no more accurate impression can be made with any material than with modeling compound if intelligently used, hence the modeling compound impression. The amalgam models are easily made, using the copper amalgam. Heat in ladle till mercury beads come out all over; put into mortar and work up as any other amalgam. Heat again if too dry, but do not burn it. If this does not bring out enough mercury add enough to make it plastic; then carefully pack it into your impression. This amalgam can be used over and over again. Crush the old models

into small bits, and they can be reduced to a plastic state much better in the heating process.

Prepare your cavity as for an inlay in the direct method. Take a piece of casting wax and place into the cavity and have the patient bite into it; remove it and lay it away. This will serve as a guide after metal model has been made by slipping it into the cavity, giving you the occlusion and the contact point of the adjoining tooth. Now take a piece of thin metal and cut a matrix to come down to the gum and wide enough to come out past the margin bucco-lingually. The outer edges should be curved so as to force the material around these margins. Let the matrix extend above the occlusal surface sufficiently to clip it on either side. Bend a part of it back on the occlusal surface of the adjacent tooth; this will prevent the matrix from being forced into the gums. If necessary slip a wedge in at the cervix of the tooth. But do not let the matrix bind the margin of the cavity, for you want the soft compound to be forced out at all points, and the matrix to hold it against a little of the tooth all around so that the margins will be clean cut. The matrix will prevent the compound from wedging around other teeth. With matrix in place take a piece of compound, in the form of a stick, and heat one end, leaving hard material behind it. Place in cavity, produce pressure so that it will be forced out over all margins. This soft material will follow the line of least resistance; make your cavity this line. Chill and remove.

Make metal model as directed, wax the bite to place by melting all around the margins, excepting the contact point and the occlusion. Cast and put it back in model; place in swager and hit it with hammer. Finish it off model, trying it till satisfied, as polishing or grinding it on the amalgam model will bring out the mercury onto your gold.

My swager is a tube of steel with a plunger to fit and some soft rubber. See that your rubber is well about your model when swaging. If your technique is right your inlay will be perfect.—*Miller W. Rice, D. D. S., Kansas City, Mo.*

Platinum Post in Porcelain Inlays:—A method of making a platinum post for retention of porcelain inlays located on the incisal portion of centrals, laterals and cuspids. This consists of preparing the cavity with the best retention possible, then drilling the hole into

which the post is to fit, and burnishing the matrix. The post is made of 36 gauge platinum cut about one millimeter in width and about $2\frac{1}{2}$ times the depth of the hole in length. Two slashes are cut in one end, about one-half the length of the piece of platinum, and it is then rolled into a post. Slitting the piece of platinum twice, leaves three free ends. After the post is put in place, these three little free ends are arched over until each one comes in contact with the matrix. The post and matrix are then removed, and after heating them to remove all foreign substance from the platinum, replace the post in the matrix. By taking care to have the three little legs in contact with the matrix, we know that the post is in exactly the right relation to the matrix. A little high fusing porcelain is placed on the matrix and worked into contact with the post. Care must be taken not to change the relation of the post to the matrix. As soon as the porcelain has dried out so as to be firm, the matrix is put into the furnace and the porcelain fused. The case is then carried to the cavity, reburnished and swaged with the sticky wax; the procedure from there on is the same as with any other inlay.—*F. H. Skinner, D. D. S., Chicago, Ill.*

MEMORANDA.

DR. L. P. HASKELL A PRINTER.

Dr. Haskell is not only the oldest dentist in Chicago but is the oldest printer, there having been no reply to his challenge for a printer who was setting type 74 years ago, as he was. On Sunday afternoon, July 11th, 1915, he was the guest of the "Old Printers' Association" at the Hotel La Salle, where he met a large number of gray-haired veterans of the "Art preservative of all arts," and was elected an Honorary Member.

In addressing them he stated that he appeared before them in a double role, as printer and dentist. He did not know of another dentist who had graduated from a printing office, and he was proud of his "Alma mater," for he had procured there an education along certain lines which had enabled him to become a writer not only for dental journals but also for newspapers. The printer's devil of those days developed into something more of a character than in these days, where his education is more circumscribed—being confined either to typesetting or press work.

PATENTS OF INTEREST TO DENTISTS.

- 1105755, Dental instrument, L. A. Chamberlin and C. H. Williams, De Soto, Mo.
- 1106914, Blowpipe, A. W. A. Bartlett and R. M. Kerr, Detroit, Mich.
- 1106815, Dental instrument, W. J. Hopkins, Chicago, Ill.
- 1106965, Blowpipe, H. D. Palmer and B. C. Sanderson, Topeka, Kans.
- 1106894, Dental mandrel, Orin C. Samphire, Milwaukee, Wis.
- 1107185, Pressure apparatus for dental castings, Heinrich Schweitzer, New York, N. Y.

- 1106758, Dental floss holder, B. F. Walker, Bridgeport, Conn.
- 1107272, Blowpipe, Paul Dumesnil, Paris, France.
- 1107280, Antiseptic case for tooth-brushes, J. F. Fouyer, Marseille, France.
- 1107631, Securing device for dental brush mandrels, P. N. Souzon, Philadelphia, Pa.
- 1107389, Dentifrice, Lee O. Waller, Philadelphia, Pa.
- 1108493, Orthodontia pliers, M. N. Federspiel, Milwaukee, Wis.
- 1108570, Dental tool-holder, John M. Gilmore, Chicago, Ill.
- 1108449, Artificial tooth, Wm. N. Kidder, Providence, R. I.
- 1108290, Set of teeth for practice work in dental surgery, F. D. Weisse, New York, N. Y.
- 1109318, Surgical inhaler, A. W. Browne, Prince Bay, N. Y., and F. L. Wallace, Lansdowne, Pa.
- 1109080, Tooth, Melvin E. Merker, New York, N. Y.
- 1109651, Tooth, Melvin E. Merker, New York, N. Y.
- 1109096, Dental crown remover, John A. West, Los Angeles, Cal.
- 1109924, Dental instrument, H. M. Hoffman and W. B. Garrett, Caruthersville, Mo.
- 1110379, Dental instrument, T. D. Craig, Albia, Iowa.
- 1110680, Tool for using dental floss, F. O. Gamble, Chicago, Ill.
- 1110791, Anchor for artificial teeth, J. W. Ivory, Philadelphia, Pa.
- 1110954, Dental casting machine, Morton Maier, New York, N. Y.
- 1110406, Tooth brush, Edward Schreck, Columbus, Ohio.
- 1111144, Tooth brush, Harris Epstein and W. Ciler, New York, N. Y.
- 1111019, Tooth brush, J. E. Hamilton, Smithton, Pa.
- 1111392, Dental anvil or swage-block, Louis F. Koehler, Chicago, Ill.
- 1111603, Dental tool, Joseph P. Mertens, Los Angeles, Cal.
- 1111177, Dental engine bracket, O. H. and A. F. Pieper, Rochester, N. Y.
- 1111178, Electrical controlling apparatus, O. H. and A. F. Pieper, Rochester, N. Y.
- 1111110, Dentist's tool, Jacob Trost, New York, N. Y.
- 1111047, Reservoir cuspidor, Henry E. Weber, Canton, Ohio.
- 46450, Design, Tooth brush, Jules J. Sarrazin, New Orleans, La.
- 1112252, Artificial tooth, G. L. Bienvenu, New Orleans, La.
- 1111730, Dental bridge, Henry P. Boos, Minneapolis, Minn.
- 1112180, Dentifrice, C. W. Westenfelder, Springfield, Ohio.

Copies of above patents may be obtained for fifteen cents each, by addressing John A. Saul, Solicitor of Patents, Fendall Building, Washington, D. C.

PANAMA-PACIFIC DENTAL CONGRESS.

August 30th, the date on which the Panama-Pacific Dental Congress will meet in San Francisco, is near at hand. The Committee of Organization desires to announce that the Congress will open on time with an exceptionally good program. About 130 papers and over 200 clinics are now promised for the program, the resume of which follows:

Practically all the exhibit space at the disposal of the committee is now occupied and no other Congress has had such a complete exposition of dental and pharmaceutical goods as will be presented here. Everything points to a large and successful meeting. Nearly eleven hundred applications for memberships are now on file and more are coming in daily.

The membership committee urges all who expect to attend the Congress, to fill out their application blanks, have them signed by a member of the Executive Committee of the state in which they reside, and forward with check, draft or P. O. money order for ten dollars to the Secretary, Dr. A. M.

Flood, 240 Stockton street, San Francisco. This should be done as soon as possible as it will save the dentist considerable trouble and annoyance, and will facilitate the work of registration. Those who have not paid for their membership, nor have filed their applications for membership, properly endorsed, but expect to obtain membership in the Panama-Pacific Dental Congress upon reaching San Francisco, must make provision to secure proper credentials from their state or local dental society, to file with their application. Those not members of any dental society must secure the endorsement of a member of the Executive Committee from the state in which they reside.

REGISTRATION.

The Importance of Registering Early.

The Bureau of Registration will be located in the Exposition Memorial Auditorium, Grove, Larkin, Hayes and Polk streets.

A branch post office and bureau of information will be established in connection with the Registration Bureau.

Members must register in order to obtain the official program and invitations to entertainments. All are urged to register as soon as they can name their hotels. The Registration Department will be open from 8:30 A. M. to 5:30 P. M. on Monday, August 30th, 1915, and these hours will be kept each succeeding day during the Congress, as long as necessary for the accommodation of those wishing to register. Be sure to bring the Membership Card sent you from the San Francisco office when you paid the membership fee.

HOTEL RESERVATIONS.

Although San Francisco can easily accommodate all those in attendance at the Panama-Pacific Dental Congress, members are urged to make their hotel reservations early. It will be a great comfort upon arriving in San Francisco to go at once to a hotel that is expecting you, rather than to make a round of hotels, finding a number of them completely filled and finally being compelled to take the first lodgings which can be found in a hurried personal search. Reservations may be made through the San Francisco Hotel Bureau, Kearny and Market Streets, or through the Exposition Tour Service Company, 155 Sutter street, San Francisco, Cal. Take the reply you receive with you to San Francisco, then on arriving all you will have to do is to go to this hotel and register.

In requesting a hotel reservation be sure to state your full name and home address, the date you expect to reach San Francisco, the number in your party, the number of rooms required, the rate per day per person, per room, you are willing to pay and the hotel you prefer—if any.

MAIL.

You may have your mail sent to you in care of Panama-Pacific Dental Congress, Exposition Memorial Auditorium, San Francisco, Cal.

The following is a partial list of the papers to be given at the Panama-Pacific Dental Congress:

"The Evolution and Development of the Mandible," Martin Dewey, D. D. S., M. D., Kansas City, Mo.

"Anomalies in Dental Pulp Structures and Their Relation to Clinical Work," Dr. V. A. Latham, Chicago, Ill.

"Research on the Resistance of the Red Corpuscles of the Blood of the Human Gums (Normal and Pathological) to the Diluted Salt Solutions," Prof. Arrigo Piperno, Rome, Italy.

"A Brief Synopsis of a Paper Entitled an Investigation of Mottled Teeth: An Endemic Affection Not Heretofore Known," Dr. Fred S. McKay, of Colorado, in collaboration with Dr. G. V. Black, Chicago.

"The Value of Bacteria Vaccines in the Treatment of Pyorrhea," Dr. Geo. B. Harris, Detroit, Mich.

"Radiography in Dentistry and Orthodontia," Drs. Brownlie and Ketcham, Chicago, Ill.

"The Etiology of Dental Abscesses, Acute and Chronic," Thos. B. Hartzell, Minneapolis, Minn.

"Acidemetris Study of the Saliva and Its Relation to Diet and Caries," John S. Marshall, San Francisco, Cal.

"An Investigation of the Character of the Various Dental Cements," Dr. Marcus L. Ward, Ann Harbor, Mich.

"Some Refractory Materials Used in Dentistry," Dr. Guy Stillman Millberry, San Francisco.

"Report on Dental Clinical Work in the Hospitals, Schools and Prisons in Manila, P. I.," Louis Ottofy, D. D. S., Manila, P. I.

"The Educational Value of Oral Hygiene in the Army," Dr. Edwin P. Tignor, U. S. Army.

"The Agencies in Ohio Co-operating in a General Hygiene Educational Campaign," Dr. Homer C. Brown, Columbus, Ohio.

"Hygiene of the Bucco-Dental Cavity as an Important Auxiliary for the Prophylaxis of Incipient Bucco-Pulmonary Tuberculosis," Dr. Ernesto A. Dam, Lima, Peru.

"Bad Root Canal Work—What Shall We Do About It?" Howard R. Raper, D. D. S., Indianapolis, Ind.

"Pain—Its Significance and Value as a Diagnostic Symptom—Its Advantages and Disadvantages and the Importance of Its Alleviation and Prevention," Dr. E. T. Loeffler, Ann Harbor, Mich.

"Superstitions of Dental Medicine," Dr. Garrett Newkirk, Pasadena, Cal.

"Therapeutic and Surgical Treatment of Roots and Their Adjacent Tissues," Dr. I. F. Biddle, Pittsburg, Pa.

"The Therapeutics of Radicular and Follicular Dental Cysts," Prof. Dr. Rudolph Weish, Vienna, Austria.

"A Few Thoughts on the Comparative Anatomy of the Maxillary Sinus—Its Relation to the Teeth, Mandibular Articulation and Alimentary System," Dr. Matthew H. Cryer, Philadelphia, Pa.

"Radium Treatment of Carcinoma," Dr. Oscar Strauss, Milwaukee, Wis.

"A Case of Acromegaly," Dr. P. Gaad, Helsingford, Finland.

"Etiology and Treatment of Oral Tumors," Dr. Fulton Risdon, Toronto, Canada.

"What Is the Line of Occlusion?" Dr. R. Ottolengui, New York, N. Y.

"An Attempt Toward Automatic Connection," Dr. Sulucana, Spain.

"Some Practical Uses in Dental Practice for Tungsten and Molybdenum," Dr. W. A. Price, Cleveland, Ohio.

"A Method of Surveying and Mapping the Dental Apparatus," Dr. F. L. Stanton.

"The Plantation of Teeth," M. J. Congdon, D. D. S., Berkeley, Cal.

"Cavity Preparation for Gold Inlays," Dr. John Conzett, Dubuque, Ia.

"The Recessional Lines of Pulp in Their Relation to Operative Dentistry," Dr. H. G. Chappel, Oakland, Cal.

"Operative Procedures in Relation to Dental Caries and Diseases of the Investing Tissues," Arthur D. Black, M. D., Chicago, Ill.

"Anoci-Association in Dental Operations," R. H. Reithmuller, Philadelphia, Pa.

"Technic in the Treatment of Pulp, Root Canal and Periapical Area," Dr. M. L. Rhein, New York, N. Y.

"Peridental Anesthesia, Intraosseous Method," Dr. Frank L. Platt, S. F.

"The Successful Scientific Treatment of Periodontal Diseases," Dr. T. Sydney Smith, Palo Alto, Cal.

"Pyorrhea Alveolaris Showing the Pathological Changes Occuring in the Alveolus Based on Microscopic Observation," Dr. Fred Hecker, Kansas City, Mo.

"The Entameba Buccalis as Seen Through the Microscope, Illustrated by Moving Picture Film and Lantern," H. Page Barley, D. D. S., Los Angeles, Cal.

"Impression Material and Impressions," Dr. Geo. H. Neilson, Cleveland, Ohio.

"Crown and Bridge," H. J. Goslee, Chicago.

"Some Fundamental Things in Dental Prosthesis," Dr. J. Leon Williams, New York, N. Y.

"Some Grave Errors in the Practice of Crown and Bridge Work," Dr. Vincenzo Guerini, Naples, Italy.

"Indications and Construction of a Rubber Obturator That Is Retained Only by the Action of the Soft Tissues," Dr. Calvin S. Case, Chicago, Ill.

"The Development of Dental Service in the Navy," Dr. Emory A. Bryant, U. S. A.

"Dental Society Organization," Dr. E. S. McCard, Seattle, Wash.

"Dental Literature—Past and Present," Dr. H. L. Wheeler, New York.

The following conventions will meet with the Panama-Pacific Dental Congress:

Federation Dentaire Internationale, Delta Sigma Delta Dental Fraternity, American Society of Orthodontists, Southern California Dental Society, Psi Omega Dental Fraternity, National Alumni, Salt Lake County Dental Society, National Association of Dental Examiners, Research Commission of National Dental Association, House of Delegates National Dental Association, California State Dental Association, Utah State Dental Society.

ASSOCIATION OF MILITARY DENTAL SURGEONS.

The annual meeting of the Association of Military Dental Surgeons will be held at San Francisco, Sept. 1st and 2nd. Wm. C. Fisher, President, Charles J. Long, Secretary.

RESOLUTIONS ON THE DEATH OF DR. J. B. WILLMOTT.

Montreal, June 18th, 1915.

Board of Directors Royal College of Dental Surgeons of Ontario,

Gentlemen: At a meeting of the Montreal Dental Club, held on Wednesday, June 16th, the following resolution was submitted:

Recognizing as we do, that for more than half a century, Dr. James Branston Willmott, has been the recognized representative head of the Dental Profession of the Dominion, in fact, as well as in name, "The Father of Dentistry in Canada," and realizing:

That not only as a teacher and Dean of a Faculty has he shown his great foresight and strength of character, but as a man and a Christian citizen, he has lived a life worthy of emulation, therefore:

Be it resolved, that we express to the Board of Directors of the Royal College of Dental Surgeons of Ontario; to the Faculty, with which for so long a time he was so closely identified; to the entire dental profession of Canada; and to the bereaved widow and son, our deep sympathy, in the loss which all have sustained, in the death of our beloved confrere. Full of years and of honors, he has fallen asleep.

The resolution was carried unanimously, by standing vote. A. Clifford Jack, President; G. G. Armitage, Secretary.

COLLEGE COMMENCEMENTS.

ST. LOUIS UNIVERSITY—DENTAL DEPARTMENT.

Graduates—J. D. Albin, V. Andrew, M. A. Axline, P. H. Bayles, B. B. Blass, C. E. Berg, D. Bouyoucoglou, F. G. Carlstead, J. W. Coulter, B. Criner, M. Dixon, H. L. Dodd, L. Douglas, W. C. Drummond, C. H. E. Dunn, G. S. Evans, F. W. Fender, L. Foster, O. F. Freitag, B. A. Fuld, E. Gilbert, P. E. Gray, F. Greer, W. H. Gregory, H. Hamburg, B. N. Hargis, F. Herschman, J. L. Huchel, A. A. Hucker, O. R. Keenan, W. J. Keough, W. Kreuger, H. E. Lartonoix, C. A. LeMaster, C. W. McGee, E. M. McGrath, G. A. Meine, W. A. Montgomery, E. B. Moore, H. G. Moran, D. H. Morden, D. B. Morris, T. E. Mosley, C. J. Murphy, R. S. Norris, A. W. Richter, M. D. Ribgy, L. E. Robbins, C. S. Rovitsky, E. I. Schilb, J. A. Schmitt, F. P. Schuck, C. A. Self, J. E. Severns, W. S. Severns, R. W. Smith, G. C. Smith, W. G. Tonkinson, E. J. Towell, R. S. Tully, B. Vogel, W. E. Wagner, A. M., J. Walter, H. L. Yancey.

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Graduates—A. H. Ackerman, L. E. Aldrich, S. Alperin, H. A. Badger, W. E. Bailey, G. D. Beierl, L. B. Bond, A. Bosscher, C. P. Bower, G. J. Broodman, C. S. Brown, R. Brown, C. F. Cantor, W. H. Cilliers, H. I. Clark, W. C. Collins, C. L. Cross, W. W. Davis, M. C. Dekker, H. R. Dingler, R. L. Donaldson, M. L. Drake, S. L. Elliott, R. F. Enstine, R. L. Felton, B. B. Foster, E. C. Freeland, W. I. French, J. N. Gallagher, V. D. Gardner, L. F. Garrison, W. P. Gibson, C. S. Hafford, V. S. Harshman, R. E. Haskett, H. D. Henderson, W. H. Hubbard, A. C. James, N. F. Jones, A. W. Kany, J. A. Kimmel, A. Kuhn, F. H. Kurtz, B. W. Lathrop, L. C. Ling, R. S. Loring, S. C. Lucas, W. McConalogue, F. W. McDonald, J. M. MacVicar, H. R. Mead, W. C. Melvin, W. W. Mitchell, C. M. Mote, C. H. Moyer, C. R. Mull, R. E. Nichols, A. J. Nishon, L. J. O'Brien, E. C. Peabody, H. F. Pedler, J. H. Penhale, H. G. Rice, B. D. Roe, H. D. Rose, C. W. Schroeder, L. A. Sherry, J. C. Shoemaker, H. A. Silverstein, E. W. Sivula, W. A. Slazinski, R. E. Smith, W. E. Smith, H. C. Striffler, G. D. Strong, F. R. C. Thorold, E. A. Waara, W. H. Waller, R. M. Waltz, L. J. Witmire.

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Graduates—G. W. Bacon, D. M. Boles, R. D. Boyles, L. D. Butler, J. T. Conner, W. B. Clotworthy, T. Coffman, J. O. Cummins, T. A. Chichester, Jr., J. L. Curry, T. M. Edwards, G. Griffiths (Miss), H. A. Graves, W. T. Hutchinson, Jr., R. L. House, F. F. Happy, F. C. Johnson, A. F. Kasper, F. D. Knox, H. J. Lambert, W. W. Martin, J. A. Moore, T. L. McMurphy, C. F. Pickering, J. E. Richardson, J. H. Shaw, E. G. Salmons.

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Jacobi, L. H. Jacob, F. J. Joubert, J. R. Keane, G. D. Keaton, J. F. Kirtz, J. A. Kirchen, A. F. Koch, L. S. Koffman, S. M. Khambatta, J. G. Kohl, H. M. Kreeger, F. S. Kubiak, M. Landesman, F. Lasch, S. S. Lepak, R. N. Lindbeck, A. J. Marcinkiewicz, H. A. Marquardt, L. C. Martin, D. H. McCauley, Jr., W. J. McCoshen, A. E. McCulloch, A. J. McDonald, J. H. McDonald, C. H. McKenzie, J. E. McKenzie, J. B. Medina, M. F. Miller, T. Miyasaki, A. H. Mueller, B. J. Neiman, G. H. Nelson, J. P. O'Connell, C. O. Olson, P. G. Papsdorf, H. Peer, A. W. Peterson, S. T. Petrie, M. D., G. Petty, H. E. Pierce, E. W. Poulson, C. W. Ratcheff, G. W. Reimche, W. Y. Ritenour, C. J. Robertson, T. P. Rose, A. S. Ruden, J. W. Sanborn, B. Sanderow, S. Sapranas, G. Schvetz, N. R. Smeltzer, J. C. Shotton, L. Sibal, R. E. Snoberger, M. S. Sorley, J. A. Spickerman, R. E. Squires, A. H. Stith, A. B., L. G. Stuck, M. E. Struble, P. J. Sweeney, G. J. Tilitsky, J. G. Toolson, O. V. Vermilye, R. W. Vornholt, R. Van Huyssteen, P. Warsaw, A. Weiss, L. W. Welp, T. H. Wilkens, Jr., P. G. Wium, W. W. Wumkes, E. Yackee, J. Zun.

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Graduates—G. Aloojian, R. H. Andrews, R. F. Bell, H. Block, F. M. Branch, H. C. Brimelow, A. S. Brown, H. Brown, V. H. Brown, F. R. Chisholm, K. I. Chun, L. A. Cobb, W. B. Cobb, H. G. Codling, C. W. Cringer, M. D., M. O. Dumas, D. L. England, W. R. Farmer, A. B., W. L. Fisher, G. B. Fuessel, J. Gibbons, G. C. Gossard, H. S. Gray, C. L. Hammar, R. W. Hayward, G. E. Hill, B. A., D. D. S., L. E. Hodges, F. I. Kimbell, J. Kleinberg, A. W. Lufkin, G. C. Leisure, C. A. MacDonald, S. L. McKellar, F. L. Mitchell, I. Okuyoshi, R. C. Petersen, F. H. Petty, P. S. Reese, G. F. Rice, H. M. Sarkisian, L. C. Schildwachter, H. M. Shaffer, C. Snipes, H. W. Sorensen, R. Swartz, E. C. Underhill, N. Young.

THE THOMAS W. EVANS MUSEUM AND DENTAL INSTITUTE, SCHOOL OF DENTISTRY
—UNIVERSITY OF PENNSYLVANIA.

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In University Council, February 12, 1915:

Doctor of Dental Surgery

Harrington, Edwin Ira.....	as of the Class of 1914
Hayes, John Robert.....	as of the Class of 1914
Lopez, E. Pedro Adolfo.....	as of the Class of 1914

KODAK MAKER WILL BUILD FREE DENTAL DISPENSARY.

GEORGE EASTMAN PROPOSES TO ERECT AND ENDOW \$300,000 STRUCTURE FOR CITY OF ROCHESTER, N. Y.

Rochester, N. Y., July 20.—Announcement that George Eastman, president of the Eastman Kodak Company, is to build for the city of Rochester, at a cost of about \$300,000, a free dental dispensary was made tonight at a meeting of the Rochester Dental Society.

Besides paying for the erection of the building, Mr. Eastman will provide \$30,000 a year for its maintenance for five years and at the end of that time will provide an endowment fund of \$750,000, if the institution proves a success.—*Public Press.*

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No. 9

ORAL PROPHYLAXIS IN ITS RELATION TO PYORRHEA AND ITS TREATMENT.*

BY DR. THOMAS B. HARTZELL, MINNEAPOLIS, MINN.

[The Work Relative to the Entamoeba in This Paper is the Product of the Research Commission of the National Dental Association, by Doctor Arthur T. Henrici and the Author of This Paper.]

Pyorrhea alveolaris begins in the gum margins. The writer of this article voiced this thought in a paper read before the North-eastern Dental Association in 1911.* Perhaps no more conclusive argument can be adduced on this point than the fact that every dentist has noticed that the removal of infected teeth results ninety-nine times out of a hundred in cessation of all inflammatory symptoms. The second corroborative fact is that removal of the infected porous root surface usually checks all types of interstitial gingivitis quickly if the work be accurately done, but if the tooth's surface be neglected and dirty, gingivitis recurs.

In the observation of more than two thousand cases, the author has found no variation from this general rule, except in cases of acute diffuse nephritis, diabetes-mellitus, and certain types of drug poisoning. The above observation was published in the Canadian Dental Journal, June 5, 1912.

That gingival inflammation is the originating point from which pyorrheal inflammations continue has been observed by many writers. A close study of the pictures of transverse section of both human and animal jaws by Talbot,¹ and human jaws by Hopewell

*Read before the Chicago Dental Society, April 20, 1915.

[We are indebted to the courtesy of the *Journal of the National Dental Association* for the loan of cuts accompanying this article.]

¹Published in the *Dental Cosmos*, 1911.

¹Talbot—Interstitial Gingivitis.

Smith² and Znamensky,³ of the University of Moscow, all show the deepest inflammation in the gingivae and the masses of leucocytes progressively less as we recede from the gingival margin. This point seems to have been given little weight by Talbot and Smith in their efforts to determine the point of origin, they, becoming deeply interested in the changes going on in the deeper structures of the advanced case, while on the contrary, Znamensky empha-

Fig. 1.



Longitudinal section of tooth and gum tissue. Chronic interstitial gingivitis. Dog. A, Enamel; E, Epithelial tissue; G, Submucous membrane; H, Periosteum; K, Capillaries; V, Violent inflammation; AA, Point of union of epithelial tissue and peridental membrane; RR, Space pocket from want of union of epithelial fold.—Talbot.

sizes his belief that the gingival margin is the point of origin. (See lantern slides of Talbot, Fig. 1, Smith, Fig. 2, and Znamensky, Fig. 3.) Perhaps the most notable article in which a rather comprehensive series of observations has been accumulated is that of Doctor Arthur D. Black which was published in the Chicago

²Smith—*Dental Cosmos*.

³Znamensky—*British Dental Journal*, 1908.

Fig. 2.



A, Free edge of cementum; B, Oral epithelium of gum tissue. Above A is a shallow pocket filled with pus during life.—*Smith*.

Fig. 3.

Fig. 3 A.

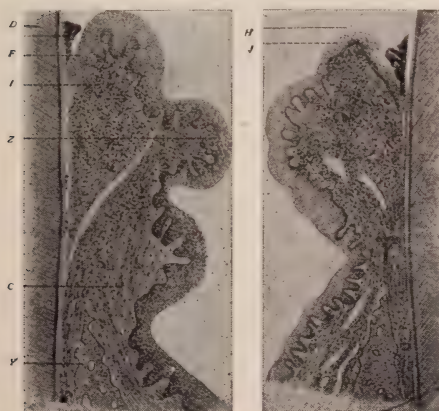


Fig. 3.—d, dentine of the tooth; p, tartar; f, papillary layer of gum; z, epithelial covering; i, infiltration of the gum with white blood corpuscles; c, healthy part of the gum; y, healthy bone. Magnified 80 times.—*Znamensky*.

Fig. 3 A.—Shows the same parts at a further extension of the disease. The peeling off of the epithelial covering can be seen (h); a wounded surface is being formed (y). Magnified 80 times.—*Znamensky*.

DENTAL REVIEW. These observations were accumulated by a group of men who worked in conjunction with him and confirmed the view already stated. In the observation and study of more than two thousand cases to date, the author has found no exception to this general rule, save those already mentioned.

Granted then that the gingival margins play an important part in this disease, our next question is, what is the explanation of this often observed fact? Is it because the tissues of the gingivae are less well protected, or is it because the blood supply to the gingival margins is less generous than other areas in the oral cavity, or is it because the irritating agent accumulates on the tooth's surface and constantly flows under the gingivae? Has systematic oral prophylaxis taught us anything upon which we may depend regarding this matter? Certainly there must be a rational explanation for the fact that inflammation of the gingival margin invariably precedes deeper infection of the tissues in the neighborhood of the human teeth. What, therefore, is that explanation? The author believes the bacterial masses on the tooth surface furnish the chief irritant and the imperfectly protected gum margin permits the irritant to enter the tissues, the blood supply being received from end capillaries, the return flow is blocked by swelling, thus creating a favorable field for bacterial invasion. We find the lingual surfaces of the lower central incisors are particularly subject to the accumulation of salivary calculus and it has been the experience of every observing dentist that we have recession of bone and gum on the lingual surfaces of these teeth, accompanied by a comparatively slight inflammatory disturbance with no macroscopic evidence of pus, just a low grade gingivitis. It is also true that gingival inflammation does not occur on the gum margins of patients who have consistently practiced oral prophylaxis on the tooth surfaces, so that the tooth surfaces are free from bacterial and mechanical irritants.

That we may more clearly correlate these two facts, namely, that clean tooth surfaces and hard gums prevent gingival inflammation, the author invites your attention first to a study of a series of stained tooth surfaces in mouths in which no especial care had been taken of the tooth surfaces in the gingival neighborhood, but in which the teeth to the casual observer seemed to be clean. You will notice from the illustration that the necks of all these teeth and proximal surfaces are black. This black color is due to the applica-

tion of a solution of iodine and iodides, first suggested to us by Doctor Talbot for treatment of inflamed and irritated tissues and later modified by Doctor Skinner for the purpose of revealing to the eye of the observer the bacterial masses upon tooth surfaces. (Fig. 7.)

The question is, what is this material which stands out in such bold relief when treated with discoloring stain? Is it simply mucoplaque material, or is it living bacteria, or both? If it is largely bacterial, what are the most constant forms found on tooth surfaces? The study of hundreds of smears taken from this locality on the tooth surfaces discloses the fact that we have universally present on these surfaces and at the gingival margin, several types of

Fig. 7.



Bacterial masses on tooth's neck.

bacteria, and these types do not stain equally well with the same stain. The absolutely universal type which stains best by the Gram method is the streptococcus viridans or the streptococcus salivarius, by others called the streptococcus mitis. This organism is absolutely universal and the writer believes it an impossibility to find a human mouth that will not produce it. If the Giemsa method for staining bacterial smears be followed, one is equally certain to find the presence of fusiform bacillus and spirochaete. The author believes that this member of the streptococcus viridans family just mentioned and the fusiform bacillus and its accompanying spirochaete are universally present in all pyorrhea pockets and tooth

surfaces.* The fact that some observers report one thing and some another does not alter the fact that these bacteria are present. It is merely an evidence of the fact that the individual has not followed proper methods for staining to make their presence evident. If he is dependent on one type of stain, it may be that that particular stain was not suited to bring out the character of growth there present. For instance, the Gram method for staining does not show clearly spirochaete and fusiform bacilli, while the Giemse method for staining will show fusiform bacilli very clearly while certain other types of bacteria will not stand out clearly. The tooth surface scrapings have been shown to contain almost every sort of bacteria that grows, but the pyorrhea pocket itself has thus far revealed to the author and his associate only two types of organism which seem to be absolutely constant, namely, streptococcus viridans and the fusiform bacillus with its accompanying spirochaete, staphylococci, pneumococci, proteus, bacillus-coli, subtilus, micrococcus-catarrhalis, and many other bacteria are occasionally found and the entamoeba is present in a certain number of these cases. The author and his associate, Doctor Henrici, have not found the entamoeba to be universally present. It is true that we have found the entamoeba in three-fourths of the cases examined, whereas we find the fusiform bacillus and the streptococcus viridans absolutely universal in their presence. In fact in our search for bacteria-free root ends in living teeth, we discovered that it was necessary to actually burn with a cautery the tissues under the gingival margin if we expected to find the root ends free from bacterial growth, and until we did so begin to sterilize by actually burning the tissues beneath the gum margin, we always without exception found the tooth's root infected. Personally, the author believes it to be almost an impossibility to extract a healthy living tooth and find the root free from viridans unless the tooth has been rendered free from bacteria by rubbing the tooth with iodine and by subsequently burning the gingival field with the actual cautery. Even with the above precautions we found living teeth whose roots were infected, showing that the vessels of the periodontal membrane form the path through which root ends are most commonly infected.

The finding by culture of viridans below the level of attach-

*Timothy J. O'leary in *Dental Cosmos*.

ment in the membrane also impresses us with the thought that streptococci are the principal organisms of pyorrhea and that amoeba and all other germs are contributing factors only. After having worked this technic out we were able to occasionally extract living healthy teeth and find the deeper tissues sterile. Furthermore, in working along this same line, we find that when the Ionic method of sterilization* has been followed out carefully in teeth that previously showed areas of rarefaction by the radiograph and bacterial infections by culture, by practicing this careful technic for the exclusion of possible bacteria that have gotten into pyorrhea pockets from the tooth surfaces and of mouth fluids that the abscess sack on extraction would be sterile, proving conclusively that it is possible to actually destroy bacterial growth in the tissues of the abscess sack by this electrolytic method.

The author introduced this bit of experience here because it tends to prove the universal presence of streptococcus viridians in the tissues surrounding the teeth, and, while we all recognize the fact that we may obtain from tooth surfaces at one time or another almost every known bacterium, we certainly must concede that the bacteria which we find *constantly deep in the tissues are the ones logically concerned in the inflammatory disturbances going on in these tissues*. Some of you may be surprised that the writer does not attach more importance to the presence of entamoeba in pyorrhea pockets and does attach so great importance to bacteria found in the tissues beyond the pockets. Therefore, the writer will break the thread of his discussion by introducing a series of pictures of amoeba to which he invites your attention. Before showing these pictures he desires to say that he welcomed with the greatest enthusiasm the possibility of curing pyorrhea alveolaris by destroying amoeba by the simple method recommended by Barrett and Smith of Philadelphia¹ and Bass and Johns of New Orleans.² While the author had occasionally noticed the fact that amoeba are present in the mouth, he had never attached any particular importance to them; in fact, he might state that amoeba have been particularly prolific in his own mouth for a long time, though he is apparently free from pyorrheal inflammation, so it never occurred to him to

*M. L. Rhein, *Dental Cosmos*.

¹Barrett and Smith, *Dental Cosmos*, 1914.

²*Journal American Medical Association*, Feb. 13, 1915.

connect the amoeba with pyorrheal processes in any way. Believing, however, that the work of Barrett and Smith and Bass and Johns deserved full credit, he obtained from the Parke Davis and Company one quart of one per cent emetin chlorid and very promptly began its use on a series of pyorrhea cases under his care, following carefully the technic advised by Barrett and Smith in this work, which is daily dosage of one per cent solution of emetin chlorid discharged deep into the pockets for a series of six days, then alternating the dose every other day until twelve or fifteen doses had been given, hoping thereby to cure these cases. The writer's experience has been that the injection of emetin chlorid has

Fig. 4.



Mouth of twelve-year-old child suffering pyorrhea, unsuccessfully treated with emetine hydrochloride.

not in a single instance checked pus flow, though amoeba have been found to be present in three-fourths of the cases.

Fearing that the emetin chlorid solution might be at fault, the author's associate, Doctor Henrici, administered two cubic centimeters of the chlorid to a rabbit which promptly evidenced all the constitutional effects of emetin, subsequently dying from physical exhaustion induced by the effort to vomit. Failing to get satisfactory results or results tending to cure with one per cent solution injected into the pockets, we, therefore, obtained fifty grains of emetin and commenced a systematic use of emetin hypodermatically, giving as a routine one-half grain per day for three days, then one-half grain every other day for two or three days more, then resting.

In no single case has the writer been able to notice freedom from pus flow. One patient, a child of twelve years, who had an exaggerated case of pyorrhea, having lost all the teeth in the upper jaw but the right cuspid and all the teeth in the lower jaw but the second molars and bicuspid, received in all twenty injections of emetin chlorid into the pockets about these teeth and subsequently two and

Fig. 4 A.

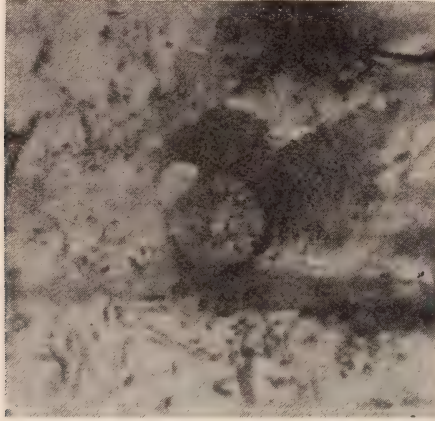


Picture of this healthy, robust looking child.

a half grains of emetin chlorid hypodermatically. The pus flow has not in any measure been checked as far as the author is able to judge. The gums are inflamed and at a recent public clinic at the midwinter meeting of the Minneapolis District Dental Society, many men at this clinic were able to see pus from the gums of this patient. Figs. 4 and 4A.

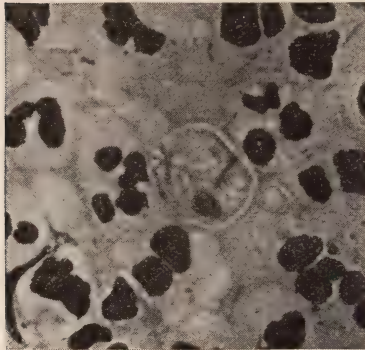
In this connection, study closely the amoeba found in the following lantern slides, Figs. 5A, 5B, 5C, 5D. You will notice that the amoeba in these preparations were taken from pyorrhea pockets

Fig. 5 A.



Entamoeba buccalis containing a phagocytosed chain of streptococci.

Fig. 5 B.

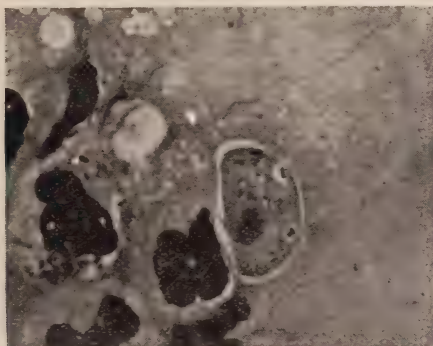


Entamoeba buccalis containing phagocytosed fusiform bacilli.

fixed in a saturate solution of bichlorid of mercury for a half hour and subsequently stained by the Giemse method. You will note that the ectoplasm and endoplasm stand out sharply. The digestive vacuoles and nuclei show equally well, and you will also note what

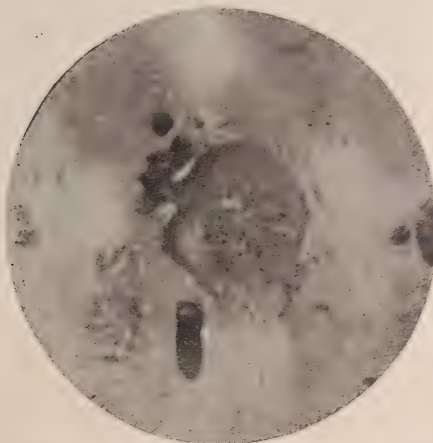
is infinitely more interesting than any other fact about the amoeba so far as the author and his associate, Doctor Henrici, have studied them, that invariably these protozoa contain within their limiting membranes many bacteria. The author personally has counted

Fig. 5 C.



Entamoeba buccalis containing phagocytosed diplococci.

Fig. 5 D.



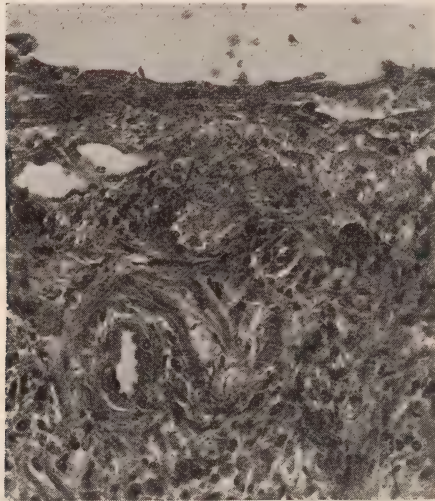
Entamoeba buccalis showing phagocytosed cocci.

seventy micrococci within the protoplasm of a single amoeba and almost invariably these amoeba, when properly stained, are shown to be in the process of phagocytosing bacteria while only about half of them contain within their protoplasm the remnants of other

tissues. It is true that a few of the amoeba studied by us seem to contain the phagocytosed nuclei of leucocytes, but the amount of phagocytosed material within the limiting membrane of the amoeba seems to be comparatively slight when contrasted with the great number of bacteria within their protoplasm.

The thought naturally comes into the mind of any one who studies this group of pictures, can an organism in the tissues which is so destructive of bacteria which we absolutely know to be responsible for many types of secondary inflammation as well as the

Fig. 6.



Pyorrhea alevolaris: Ulcerated gum taken from near root ends, showing chronic inflammation—no amoeba in the tissues altho many were present in the pus.

chief etiological factor in apical abscess, I repeat, can an organism which is so destructive of bacteria which are harmful to the human body be accounted unfriendly? If all amoeba are as destructive to bacterial growth as are the ones shown on the screen here, it would seem a better plan to perpetuate their growth rather than to destroy them.

I here invite your attention to a series of lantern slides showing human tissue taken from the sides of human teeth which were exhibiting intense pyorrheal inflammation (Fig. 6). These tissues

were removed with the teeth and hardened, cut, and stained for the express purpose of studying their amoeboid content. We find many bacteria on mucous membranes, and the smears from the pockets taken before these tissues were cut away showed a few amoeba and infinite numbers of what proved to be streptococci in culture. A close study of these tissues, however, does not reveal a single amoeba embedded in the tissue. It would seem if amoeba were pathogenic that these five cases should show amoeba embedded in the granulation tissues of the bottom of the pockets, but they do not.

In the last two years we have been encouraged to believe by Hansen of Christiania¹ that there was a specific microorganism responsible for pyorrheal infection, designated by him as bacillus pyorrhea, though the writer and his associate, Doctor Henrici, have been absolutely unable to find an organism corresponding to the bacillus pyorrhea of Hansen in pyorrhea pockets. The bacillus subtilus, a common laboratory growth, more nearly fills the morphological and cultural requirements of Hansen's bacillus than any we have yet been able to find.

The medical and dental professions all over the world have been lead to believe that the amoeba is the responsible factor for all pyorrheal processes and that its destruction would be a panacea in the cure of pyorrhea, and the author earnestly hopes that this may be true. Nevertheless, his own experience does not lend color to this belief and we are thrown back upon the best teacher we have had in this matter up to the present time, namely, experience, which indicates in no uncertain terms that the gingival margin is the point where pyorrheal inflammations begin and that the pyorrheal inflammations are wrought by and maintained by the poison *proteins induced* by the presence and destruction of mixed bacterial infections by the body ferments,² and experience has also taught us that clean tooth surfaces preclude gingival infection and that heavy massage of the gums also tends to harden and render more resistant the gingival margins to infection. Experience has further taught us that the logical place to begin the treatment of pyorrhea is the tooth's surface and that the first step in the treatment of any pyorrhea is to demonstrate to the patient and to the operator the

¹*Journal of Norwegian Dental Society*, 1914.

²Victor C. Vaughan's—"Protein Split Product in Relation to Immunity and Disease."

relative amount of bacterial growth on the tooth's surface (Fig. 7). This is important to them both, important to the patient because it directs his attention to those areas of the tooth's surface which need the greatest daily care, and important to the operator because it explains to him the reason for gingival inflammation where oftentimes no other rational cause can be found. Following such demonstration, the next step should be the elimination of all rough areas on the tooth's surface which may retain bacteria on or in the tooth surface, and this is accomplished by applying to them the type of stones shown upon the screen (Fig. 8), swinging them across the enamel surfaces, thus bringing out the pits that have been induced by the acid formed by the bacteria on these surfaces, getting rid of the bacteria themselves and polishing out the inequalities which serve

Fig. 8.



Arkansas and Carborundum stones used to perfect the tooth surfaces.

to retain and foster bacterial growth. After the use of the coarse stones on the tooth surfaces, disclosing stain should be again used to make sure that all pits have been beveled out. After all pits that contain bacteria and inequalities have been beveled out, and the application of the disclosing stain reveals nothing, then the tooth surfaces should be thoroughly polished with the type of Arkansas stones shown on the screen, and the brilliance increased by the use of moosehide wheels loaded with jeweler's rouge or with any other abrasive which will give a high degree of brilliance to the enamel.

When the tooth's surface has been properly cared for in this manner, we are then ready to attack root surfaces. Before proceeding to a discussion of the pyorrhea pocket, the author desires to

discuss for a moment other forms of irritation than that of bacteria which may be responsible for gingival inflammation and will make the statement that any irritant which will tend to induce congestion of the gingival margin favors bacterial infection; *e. g.*, lack of contact point, permitting the bruising of the soft tissues, ill fitting regulating appliances, the mechanical irritation of bands, imperfect fillings, malocclusion, thus delivering undue force in some point in certain directions, all of which induce congestion and which in time stimulates osteoclasia and destruction of the bone just as surely as will bacterial growth or the continued application of force by regulating appliances.

There is an additional reason for beginning the treatment of pyorrheal infection on the tooth's surface, the introduction of polishing materials into the pockets themselves. Pumice or silex introduced into the pocket must always be an irritant to the tissue cells of the surrounding area. If all polishing and cleansing of the tooth's surface is done before the pockets are disturbed by scalers or planes, we avoid getting polishing material into them.

There may be a specific microorganism which is responsible for pyorrheal infection. While the author has not proven the streptococcus viridans to be the specific organism, he is thoroughly of the opinion and belief that this family of viridans is the chief offender, because of its universal presence in the pockets and in the tissues and because of its definitely proved relationship to dental abscesses and secondary lesions. It is *not proven*, however, *that it is certainly the etiological factor, though the evidence is slowly accumulating which in the end may be accepted as proof, sufficient to justify our believing it to be the specific factor*, for wherever this organism locates in the tissues the result is death of tissue and the question naturally arises, where and how does it enter the tissues? Some authors¹ would have us believe that it is blood borne and introduced through the tonsil or from some other area of the body. The author does not believe this to be true, however, for the reason that most observers unite in the belief borne out by experience that the streptococcus found in tonsils is hemolytic. Davis² reports ninety per cent out of 115 cases to be hemolytic. Rosenow's observations

¹Ulrich—DENTAL REVIEW, December, 1914.

²Davis—*Journal Infectious Diseases*, Vol. 10, 1912.

confirm the belief that the streptococcus found in tonsils is hemolytic. Dwyer and Gignoux also confirm this fact.² In the author's experience with two hundred and fifty cases, only one root tip abscess was definitely proven to be hemolytic, which streptococcus was found and isolated from the dental abscess in the mouth of a young Hollander by Mr. Gaskill in the early part of the winter of 1914.³ With this one exception, no other example of hemolysis was found by Mr. Gaskill and in some two hundred cases in which the streptococcus viridans has been isolated in pure culture by Doctor Henrici, no single example of hemolysis has been observed of a family of streptococcus viridans isolated from root tip abscesses or pyorrhea pockets. Gilmer and Moody⁴ reported a short series of cases in which they found hemolysis, but the hemolysis was not definitely proven to be due to streptococci infection as they cultured directly from the infected field to blood agar, and there are many other bacteria save hemolytic streptococci which will hemolyse blood, and the hemolysis reported by them may and is probably due to the admixture of other bacteria in their cultures. In our work, our cultures⁵ have invariably been plated out until the bacteria were obtained pure, and I repeat again, none of these cultures have been hemolytic. I, therefore, do not believe that the infecting streptococcus in either the dental abscess of the pyorrhea pocket is introduced from the tonsil or the general blood stream, because if it came through the tonsil path and was deep in the tissues, it certainly should hemolyse.⁶ We are, therefore, thrown back on the belief that these bacteria are introduced into the tissues by direct continuity of tissue following down from the tooth neck into the pocket and also that apical abscesses may be planted from bacteria introduced in the same manner or through the root canals themselves. That it is easily possible for bacteria to enter the peridental structures from the gingival culdesac is a fact. The writer of this paper has repeatedly demonstrated openings in the bottom of the gingival

²Dwyer & Gignoux Bacterial Exam. of Tonsil Crypts, from Manhattan eye, ear, and throat reports, Feb. 1912-1913.

³Hartzell—*Dental Bulletin*, 1914.

⁴A study of alveolar abscess and infected root canals—*Journal A. M. A.*, December 5.

⁵*National Dental Bulletin*—Report on Infections of Mouth—Hartzell, Henrici, Leonard.

⁶Barn's—*The Tonsils*, Page 68-69.

crevice of absolutely healthy teeth and these openings may readily be shown to exist by the use of oxygen under compression which may be allowed to flow from a blunt nosed needle into the gingival crevice. The needle is not to be thrust into the tissues, but simply introduced into the gingival crevice, without pressure of the point into the tissues. A stream of oxygen thus directed into the gingival crevice will usually find its way from two or three points at least into the tissues and its movement in the tissues may be noticed for

Fig. 9.



Rough root surface, ulcerating gum margin, and bone of the alveolar process covered by a layer of granulation tissue.—*Talbot*.

distances of as much as a half an inch or more away from the point of entrance.

The author has repeatedly demonstrated this possibility in the case of his own teeth, the gums of which are healthy, firm and pink, and has also noted it in a large number of other individuals and he believes that it is through these openings leading into the deeper structures around the teeth that the bacterial infection of these structures occur. Without doubt, the most valuable work that has yet been done in the gross pathology of inflammation of the tissues

contiguous to the teeth is that of Doctor Talbot,¹ and the author now invites your attention for a few moments to pictures from the work of Talbot. Doubtless, these are familiar to most of you and the writer desires these pictures here in order to illustrate a phase of the treatment of this disease which has always seemed exceedingly important. You will notice in Fig. 9 that the soft tissues are ulcerating, that the peridental membrane has been destroyed to a considerable depth, and that the cemental coat of the root surface is rough and irregular, and that there is no exposed bone showing in

Fig. 10.



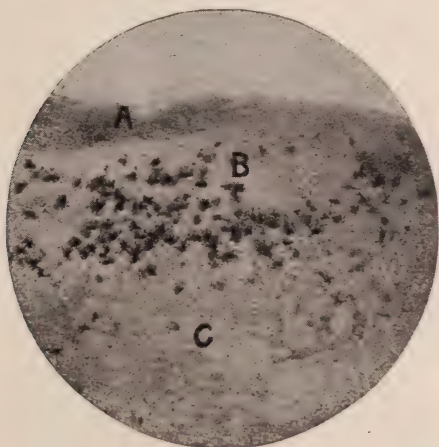
Area of root surface showing its pitted character, the white areas being the stump holes of fibre ends. The dark areas show the more dense walls of the pits, prepared for Dr. Hartzell by Doctor Carl R. Lemstrom.

the pockets. You will also notice the dense masses of leucocytes which predominate in the mass of ulcerating tissue surrounding these roots. The application of the principles of surgery to a study of the lesions of this type would seem to indicate that the first thing to be accomplished would naturally be the removal of the dead, dying, and necrotic tissue which pockets of this type are sure to contain. The enormous mass of leucocytes encompassing this field ought under normal conditions to overcome these infections. These leucocytes are naturally engaged in phagocytizing the bacteria grow-

¹Talbot—Interstitial Gingivitis.

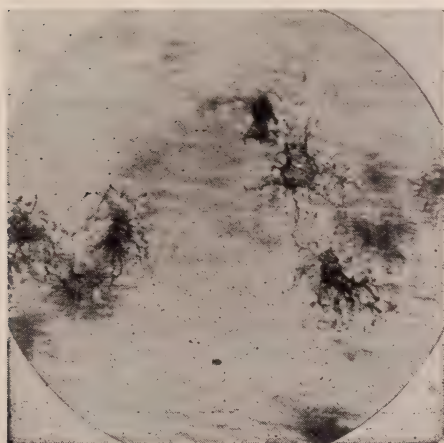
ing in these pockets, and there is not the slightest doubt that this wall of leucocytes destroys an enormous amount of bacteria found

Fig. 11.



A—Surface not treated. B—Surface too deeply planed, exposing lacunae to infection. C—Surface correctly planed.

Fig. 11 A.

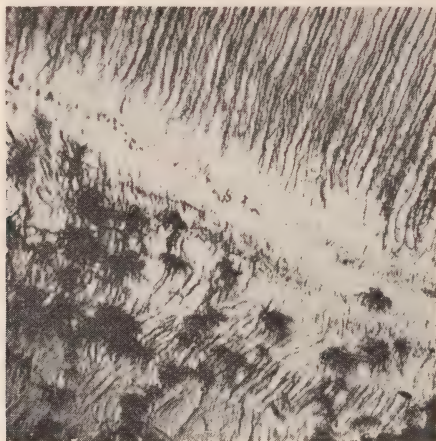


Shows lacunae from center of field in Fig. 11.

growing in these crevices. In addition to the phagocytizing of this bacterial mass, the wall of leucocytes acts also as a limiting factor in the

spread of bacteria from these foci into the general circulation. However, we all must realize that the leucocytes though endowed with amaeoid movement cannot and do not readily cross the crevice to the root itself and the bacterial examination of the material of the root itself shows that it is always heavily loaded with growing organisms. It naturally follows therefore that on account of the rather limited movement of the leucocytes that they only do efficient work in the destruction of bacteria, as bacteria are brought in close contact with them and the tooth's root surface must of necessity receive little or no help from them. Here for a moment study pictures of tooth root surfaces as they appear when the fibre ends

Fig. 12.



Lacunae near ends of tubuli.

are digested out of the tooth's root surface by appropriate media (Figs. 10 and 11). You will note in the study of this second slide which is under a quarter inch subjective that it presents three distinct characters of tissue, namely, this rough surface that has been untouched by instruments which appears on the left. The center of this field shows a great many lacunae and the right side of this same field shows a plane surface in which there are a comparatively few openings. This particular slide was especially prepared to contrast these three conditions.

The author next invites your attention to this picture which shows distinctively the dentin of the tooth structure and outside or

overlying this dentin field, you will note the inner layer of the cementum in which you see a great number of lacunae (Fig. 12). These lacunae are most numerous near the ends of the dentinal tubuli and diminish in number as we approach the outer surface of the root. Turning back to the slide which presents the three characters of surface, you will notice that as we closely approach the surface of the root there are comparatively few cementoblasts in the lacunae of the cementum and that there is a considerable breadth of tissue in which there are very few or no cementoblasts. I wish you to give particular thought to the morphology and histology of this tissue, as the writer believes it to be infinitely important in the treatment of pyorrhea pockets, because it affords the reason for planing root surfaces and also shows just the depth one dare cut to advantage. Following the general rules of surgery with infected pockets of this type the natural thing would be to curette the ulcerating tissue. As far as the necrotic remains of the soft tissues surrounding the tooth's root is concerned, that is surgically easily accomplished. As for the alveolar process itself, you will notice from a study of Doctor Talbot's pictures that the bony process itself is seldom exposed in the base of the pocket, and that the very deepest portion of the pocket is densely packed with leucocytes. Therefore, the greater amount of material which is stinking and necrotic to be removed from these pockets is resident on the root surface itself and experience in thousands of cases has taught us that careful removal of serumal deposits (Fig. 13) in those cases where they exist, together with the careful removal of necrotic remains of the periodontal membrane wonderfully increases the health of the surrounding tissues in a marvelously swift manner. The exact technic of doing this work on the root's surface involves very much more than would appear from a casual study of these tissues. In the first place, the amount of dead necrotic material upon the root surface, while considerable in area, is very shallow in depth and when instruments of any character, planes, files, or scalers are thrust into these pockets, the operator should have in mind the structure of the tissue upon which he operates for the simple reason that if in removing the dead necrotic root surface, the operator carelessly cuts down a sufficient depth to open the lacunae of the cementum, that though his initial result may point toward health in the improved appearance of the gums and sur-

rounding tissues, yet in the end these root surfaces re-infect because the lacunae have been opened and their protoplasm must soon die and become the host of an infinite number of bacteria. Therefore,

Fig. 13 A.



Calculus on root surface. How futile to expect medicines of any kind to benefit a tooth with deposits of this character.

Fig. 13 B.



Calculus on the root surface.

the surgical treatment of these root surfaces should be done with great care and delicacy and the operator should aim to remove all of the dead necrotic remains and leave a brilliant smooth surface.

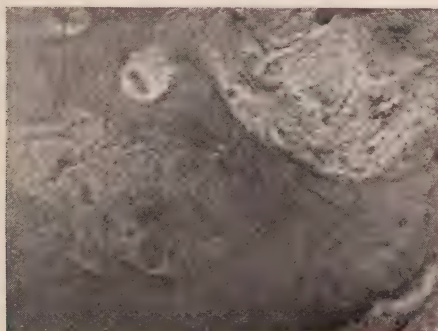
Such surfaces do not readily reinfect, as they have nothing upon them to hold bacteria, whereas roots that are scraped deeply into the cementum will always hold bacteria. The writer believes this fact explains why certain operators who handle the teeth they treat roughly have many recurrences of infection while others who have greater skill and patience have comparatively few recurrences of infection. The moment the dead root surface has been carefully removed, the inpour of new leucocytes is exceedingly rapid because the blood vessels which supplied the bone and peridental membrane have not been entirely destroyed, though their ends have been blocked by an obliterating endarteritis, which is the specific lesion of pyorrheal infection. The operative interference necessary to clear the root surface breaks down these endarterial structures and permits of a great outpour of blood into the pyorrhea pocket itself. This bleeding is an excellent thing, as it tends to carry out of the pocket infinite numbers of bacteria and also introduces into the pocket fresh arterial blood, which is nature's provisional filler of every wound and a better antiseptic for such wounds than any drug which we could place in them. To briefly describe the character of this type of surgery may be of some interest in this connection. It is most easily accomplished with planes of self-limiting cutting depth. The operator should begin at the neck of the tooth and with short strokes remove the dead material, each stroke going a trifle farther into the pocket until he finally has planed off all the objectionable material to be removed. As the surface cannot be seen the operator must depend on his sense of touch. On the root surfaces where there is no deposit, the sharp plane encounters first the dead peridental membrane which evokes sensation which the author might liken to touching silk velvet, a sort of fleshy feeling. A few strokes with the sharp plane removes this velvety material and brings the plane in contact with the uneven bony surface of the root itself. This produces a sensation entirely different than that produced by the touching of the dead peridental membrane and cannot be well described in words. If, however, the root has upon it serual calculus, the sensation conveyed to the operator by the plane bit through the medium of the handle of his instrument, might be comparable to the application of a steel edge to a concrete or a stony surface. Upon removal of this stony, gritty material in the one case, or the removal of the velvety dead remains of the peridental mem-

brane in the other, the plane bit rapidly renders the surface smooth and conveys to the operator a sensation comparable to that evoked by rubbing a steel burnisher over polished ivory. In contrast to the sensation evoked by touching dead peridental membrane or calcific deposit, the sensation is so markedly different that after it has once been experienced, the operator can definitely know that he has removed all that should be removed from the root surface. If now the operator, heedless of the fact that he has reached the hard layer, continued to cut with sharp instruments for a few seconds on this smooth ivory-like surface, which he has been able to produce by the removal of dead peridental membrane or calculus, the operator will soon find that the instrument will chatter and the sensation will be as vitally different to him as the sensation evoked by bringing a sharp curette over the bony plate of the alveolar process as compared to the sensation evoked by the same curette when used in the spongiosum of the loose areolar bone inside of the bony plate. It naturally follows that the fewer acunae opened, the less subsequent reinfection. As the operator approaches the bottom of the pocket he will encounter granulation tissue. This granulation tissue is a mass of leucocytes which interposes between the bottom of the pocket and living tissue beyond and serves to protect the living tissue from further incursions of bacteria and also surrounds the obliterated ends of the vessels which feed the tissue. It is an advantage to press the plane bit into this mass of leucocytes in order that every bit of diseased root surface may be removed and also to break up the granulating wall and open the obliterated ends of the vessels in this locality. The action of the plane bit will naturally withdraw from the pocket most of the planed off material. If the operator is in doubt as to whether the pocket is free from loose material, it is wise to syringe the pocket with Ringer's solution or normal salt solution.

Assuming always that the diagnosis has been properly made by X-ray if possible, and the advisability for treatment of any given case determined and that the work has gone forward to the removal of the diseased root surface, the next thought which confronts us is the possible regeneration of bony process to compensate for that which has been lost. The regeneration of bone, of course, proceeds from living bone. This has been well proven by the work of

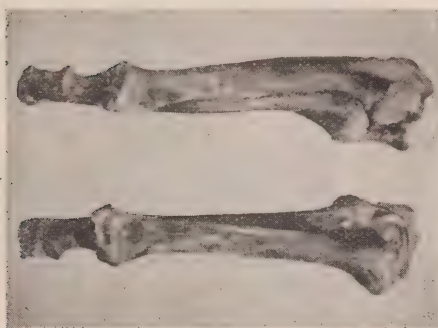
Macewen¹ of Glasgow, whose classical experiments in this direction must ever be remembered (Figs. 14A and 14B). He was able to remove portions of long bones in dogs and interposed between the cut ends of these bones small glass tubes, which glass tubes filled up with new bone in from four to six weeks, the outpour coming from the cancellus bone cells of the ends of long bone and not from

Fig. 14 A.



Spongy bone growing in glass tube.—Macewen.

Fig. 14 B.



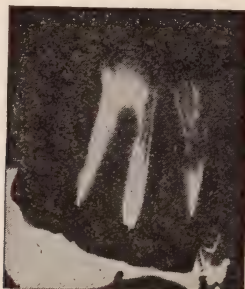
Transplanted sections showing perfect union.

the periosteum. Accepting the fact that new bone comes from pre-existing bone cells, can we do anything which will tend to repair the loss of bone already suffered? The writer believes to a limited extent that we can, by simply following the laws of general surgery

¹Macewen—The Growth of Bone.

in relation to bone growth. Therefore, our need is freshly opened bone cells, absence of general infection, absence of pressure, and rest (Figs. 15A and 15B). Presuming the pyorrhea pocket and root surface to be as surgically clean as they can be gotten, our next step is to reach into the process with a fine sharp instrument and lightly stir or roughen up the process edge. This stimulates

Fig. 15 A.



The implanted tooth in socket from which 13 B was removed.

Fig. 15 B.

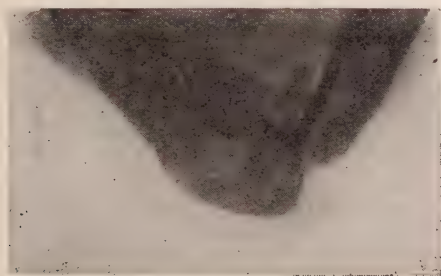


New bone around implanted tooth
one year later.

the bone cells to an outpour of callus. If the pocket be filled with sterile blood clot, the new bone cells pour out and in some instances actually pile up against the root surfaces never in great amount because the pressure of surrounding tissue limits the amount of outpour, because we begin to have shrinkage of the overlying soft tissue as soon as we remove the irritating debris of the root surface and of the gum limits the outpour of bone from the thin process

edge. The subsequent entrance of bacteria from the tooth's surface and saliva into the pocket also tends to limit the bony outpour. Movement of the teeth themselves also tends to limit the bony outpour. If, however, the teeth are made rigid by a splint, the root surface clean, the process edge lightly curetted, the pocket filled with blood and protected from infection, we can confidently expect a certain amount of bony outpour from the process edge. Just in proportion as we can maintain these sensible requirements will we be able to gain new bone. Some men deny the possibility of regeneration of bone of the jaws. The author draws your attention to a lantern slide in a case first operated by Doctor R. E. Farr of Minneapolis, wherein he removed an inch and a half of the mandible for

Fig. 16.



Radiograph of Dr. Farr's case showing complete repair of mandible from whence one inch had been removed. An iridio platinum splint placed by the writer to hold the cut ends apart can be seen in the picture.

the removal of a malignant growth. The writer subsequently placed a splint of iridio-platinum wire connected with the left cuspid and laterals and the right second and third molars. A radiograph of this jaw some two years after the splint was put in position shows that the bone reached across from the left to the right side and that the bony continuity of the mandible has again been restored (Fig. 16).

The writer also wishes to show in this connection a picture which illustrates the ability of the process to pour out new bone around and against the teeth. This particular picture was obtained from the late Doctor Fletcher with whom the writer of this article had much in common. Its origin was briefly as follows (Figs. 17A, 17B and 17C):

A patient had applied to a dentist for the removal of a lower bicuspid tooth. The dentist had attempted its extraction and had broken the tooth off well below the gum level and had then left this tooth in position. The gum had healed and the patient was none the wiser. Subsequent disturbance in that locality caused the patient to apply to Doctor Fletcher, who discovered that this root still remained in the socket. He cut down upon and uncovered this root and discovered that the alveolar process seemed to cover it. He

Fig. 17 A.

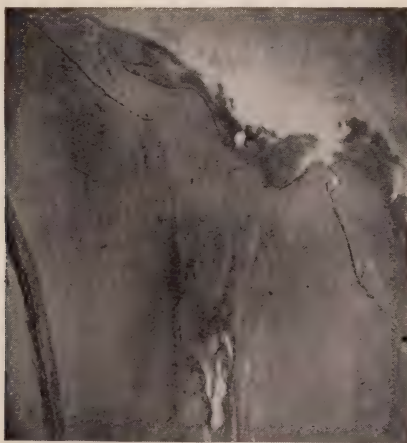


Extracted tooth with new bone in pulp chamber. Fletcher's case.

extracted the root and subsequently had sections made, a picture of which I throw upon the screen, showing new bone deposited on the broken root end and pulp chamber of this tooth. A second picture shows an area of alveolar process photographed from the center of this chamber. While we all recognize the fact that the alveolar process is not a favorable field for regeneration, these examples show conclusively that if we can maintain our case under proper conditions that we certainly may expect a small amount of new bone at least in many cases. That bony outpour does frequently happen

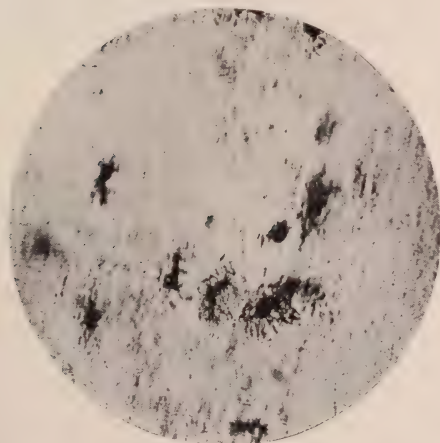
in the experience of every man who treats pyorrhea is proven by the fact that teeth that have been denuded of a large amount of bony support and subsequently treated successfully become more rigid,

Fig. 17 B.



Pulp chamber of 17 A showing new bone.

Fig. 17 C



Lacunae from center of 17 B. Fletcher's case.

comparatively speaking, than healthy teeth that have never undergone pyorrheal inflammation. The explanation of this fact is that

a small amount of new bone has been poured out and piled up directly against the root surfaces, and, having no elastic peridental membrane interposed between the root surface and the new bone, you have an analogy to ankylosis, which occurs about implanted teeth. Presuming that this treatment of a case has been successfully carried to this point, is there anything further the operator may do to enhance regeneration? The author believes there is, and that the next step should be to protect the sterile blood clot in the pockets from the incursion of bacteria from the saliva and the tooth's surface. The bacterial growth is constantly recurring on tooth surfaces, and its inhibition or prevention must necessitate a constant battle to the end of life. Immediately following the surgical treatment, the application of some substance which will seal the pockets securely and protect them from bacterial incursion is advisable. Many substances have been recommended for this purpose. The most valuable one of which the writer has knowledge is the following:

Merck's beechwood creosote saturated with all the iodine it will dissolve, as suggested by R. B. Adair.

This makes a heavy black oily mixture and is to be applied to the gum edge and to the neck from one-eighth to a quarter of an inch to the gum edge and reaching up on the tooth neck to the enamel of the crown. Carefully preventing the saliva from touching this after it has been placed, we immediately apply a second coat composed of glycerin in which we have incorporated all the tannic acid that it can be made to dissolve. Thus the tannic acid most completely covers the first coat of creosote-iodine, and, if it is placed before moisture comes in contact with the creosote-iodine, the two solutions seem to unite and form a dense, tough, black brown material which will cling to the tissues from twenty-four to forty-eight hours, protecting the gingival margin from a bacterial incursion for that period of time. If thought advisable by the operator, the coating may be repeated every other day for several days, thus maintaining a condition of approximate asepsis. The author might state in passing that the application of this double coating to sutured incisions in the mouth protects these edges from infection and renders a wound much more comfortable than otherwise would be the case. It may also be applied to the cut edges where third molars have been uncovered by removing the gum. As soon as the bleeding

has been checked by the application of hot packs, the cut surfaces may be coated with this heavy iodine solution followed by the tannic acid glycerin solution and the cut surface will be protected from infection and also from the irritation of the movement of the tongue. The method of carrying on pyorrhea treatment should follow certain definite lines and the judgment of the operator should be governed by the condition of the patient. In cases where we have only mild gingival inflammations and shallow pockets, the work may be rapidly accomplished without hurt to the patient. On the contrary, if the patient be subnormal in resistance, the pockets deep and heavily loaded with organisms, then the operation should be continued over a period of weeks involving only two or three teeth at each treatment. There are two reasons for this course. The first

Fig 18.



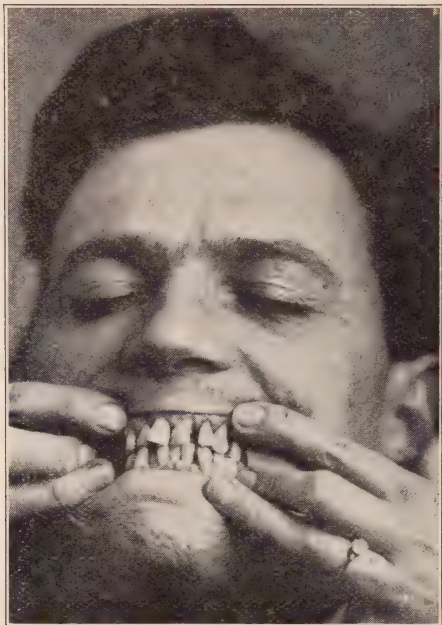
Before Treatment.

is that if the limiting wall of granulation tissue so beautifully shown to be present in all these pockets by the pathological work of Talbot and others, I repeat, if the limiting wall of granulation tissue be broken down rapidly, an enormous inoculation of the patient occurs at once, and this enormous inoculation may result in an acute disturbance, wherein metastatic transfer plays an important part, and set up a myocarditis, endocarditis, joint infection, or acute abscesses, or chronic infection of the kidney.

The author has learned by bitter experience in the treatment of actual cases that haste in the treatment of these subnormal cases is exceedingly dangerous and subversive to the best interests of the patient, as he has noticed acute joint infection and even pneumonia to result in rapid sequence from, as he believes, over inoculation from the tearing down of the limiting wall of the granulating tissue which

must of necessity be broken down in the rapid treatment of these cases. A second reason for slow treatment by easy stages of these pyorrhea cases lies in the fact that if the dosage of bacteria be gradually increased from time to time, the ability of the blood stream to overcome the recurring doses of bacteria which of necessity must be forced into the blood stream by the surgical treatment, gradually raises the immunity of the individual so that at the end

Fig. 19



After Treatment.

Blood pressure fell from 150 to 120. No treatment and no emetine or other drug was administered, showing clearly that it is possible to bring about great changes in the treatment of pyorrhea without drugs by efficient surgery only.

of a period of a month or six weeks' treatment of a case of this type, the patient's general resistance is steadily raised and appetite, ambition, and general well-being enhanced. In fact, treatment so carried on has all the good advantages of a polyvalent vaccine and none of its disadvantages. The effect of local treatment is clearly shown in Figures 18 and 19. The post-operative care of an individual deserves also careful consideration.

MASSAGE—WHEN AND WHY ADMINISTERED.

Massage of the gum margins should not be commenced following operative treatment until all outpour of bony callus from the process edge has ceased for the simple reason that massage tends to shrink and toughen the gum tissue and prevents further bony callus being poured out. As soon as the operator is satisfied with the amount of bony callus which he has gained, he may then begin massage. This massage should be suited to the gum tissue. Perhaps the best method of massaging the gums is with the cut end of the short heavy cotton roll. The dry cotton roll clings to the gum tissue and when held in a hemostat is easy of use by the patient. Its advantages are briefly that it expels the stagnant fluid from an edematous gum margin and permits inflow of fresh arterial blood. The act of massaging the gum margin drives into the circulation any bacteria that may have gained access into the tissue and places them where the leucocytes of the general blood stream will rapidly phagocyte them. General massage is in itself a kind of auto-vaccination and drives the enemy out of the field of action where it is more easily conquered and replaces the enemy in the field of action with new soldiers from the blood stream, with the added benefit that the epithelial coat and connective tissue composing the gum are caused to grow more firm and dense and resistant, thus fortifying the gum margin from further infection by enhancing a more perfect structure and locking the door to further infection.

The weekly use by the patient of the disclosing stain to guide him in his daily mouth hygiene has a double benefit. The solution now used by most men for disclosing purposes is that mentioned in the beginning of the article, and, though many times published by those who use it, the writer will give its composition once more for the benefit of the younger men who do not happen to be acquainted with it: Iodin, fifty grains, zinc iodid and potassium iodid each fifteen grains, water and glycerin each four drams, making a total liquid bulk of one ounce with a total bulk of eighty grains of solid material incorporated therein. This should be very carefully triturated and may be sponged on the soft tissues and tooth surfaces without harm occasionally. The author believes it is too concentrated for daily use. Its double benefit accrues from the fact that it destroys instantly the vitality of the bacteria with which it comes in contact and also brings into view the fields where they

grow in greatest number undisturbed, thus guiding the patient to a more careful effort in the daily hygiene of the mouth.

Daily prophylaxis by the patient is the greatest safeguard against reinfection and the monthly prophylaxis treatment by the dentist is the best guide to the patient's endeavor. Treatment by the dentist should be very carefully done and not left to careless hands. In this prophylaxis work the injury of the gum should be distinctly avoided as well as injury to the enamel surface and exposed cementum. It is possible to conceive that too vigorous or ill-advised use of the polishing material on either the enamel or dentin surfaces can do these tissues great harm, even destroying or cutting grooves in them, and has given ground for criticism by many conservative men. This phase of treatment is so well understood that the author deems it unnecessary to discuss it under a special head.

There is, however, one more thought regarding this matter which appeals to the writer as of vast importance, and that is the question of so guiding the daily life of a patient in the matter of food and diet that the oral cavity as well as the balance of the body increases its immunity to all types of infection. The work of Doctor Pickerel and Professor Gies of Columbia in this direction should be read and understood by every one of us. The work at present being carried forward by one of our own number, Professor Bunting of the University of Michigan also should bear fruit in this direction. The net result of the work of Professors G. V. Black,¹ Pickerill,² and Gies³ has been to indicate to us that we can accomplish an enormous amount for our patients by first limiting diet to exactly what we need for our daily regeneration, thus *avoiding excessive deposits of calculus*, ingesting those foods which tend to produce a salivary fluid inimical to the growth of bacteria, and the use of such fluids and mouth washes as will promote a normal salivary outpour. This, to the mind of the writer, is an enormously valuable contribution and should never be lost sight of.

The title and scope of this paper does not admit of a lengthy discussion of these phases of the treatment of pyorrhea and prophylaxis, and the author feels in closing that in order not to create the

¹Black in DENTAL REVIEW, 1913.

²Pickerill on Decay.

³Gies' research report, *Journal of Allied Societies*.

idea in the minds of this audience that he believes surgical treatment of pyorrhea is the Alpha and Omega of the subject, it should be stated that the powers that make for immunity should be always carefully considered.

I thank you for your kind invitation to appear before you and for the delightful courtesies that I have received at your hands.

REPORT OF COMMITTEE ON LEGISLATION.*

BY DR. C. R. E. KOCH, CHICAGO.

To the Illinois State Dental Society:

Your Committee on Legislation begs leave to report that after having four separate conferences, during the last six months, with the members of the Illinois State Board of Dental Examiners and several representatives of each of the three dental colleges or schools of this state, they have caused to be introduced identical bills in the two branches of our General Assembly.

These bills are known as House Bill No. 270, which was introduced by Mr. Igoe on March 12th, and as Senate Bill No. 314, which was introduced by Senator Austin on April 14th.

On April 28th, Dr. T. P. Donelan and the chairman of your committee, together with Dr. O. H. Seifert, the secretary of the State Board of Dental Examiners, appeared before the Judiciary Committee of the Senate and of the House and explained the necessity for the proposed changes in the dental law, and succeeded in having the bills passed out with favorable recommendations by each committee.

An unusual pressure of questions of intense interest has absorbed the attention of the Legislature since then, which has prevented further progress of our measure to date.

The bills propose to amend Sections 3, 4, 9, 11, 12 and 13 of the present law, and leave all other sections of it as they now stand.

Section 3, as proposed, omits holders of medical diplomas from eligibility for examination for the dental license. The experience of the Dental Board has shown that only few medical men in later years have availed themselves of the privilege, and these invariably

*Read before the Illinois State Dental Society, May, 1915.

have failed to pass. The rules governing dental schools all over this country give only one year's credit on the dental course to medical graduates, and require such graduates to spend two years in dental study before reaching eligibility for the dental degree. Therefore the provision of the present law in this respect is incongruous and incompatible with the progress of dental educational thought and practice. Section 3 is further amended by providing that all examinations in theory shall be in writing, and that the examination papers and records thereon made shall be deemed public documents and preserved for at least two years after the board has acted upon them.

Section 4 is amended by prescribing a preliminary education equal to a completed course in a four-year accredited high school for students before they can enter upon a course of dental study. For students who claim to have attained an equivalent to this standard of preliminary education, but who cannot produce diplomas or certificates from accredited secondary schools, a committee of three state examiners is provided, before which they may appear and show their qualifications. This committee is to be appointed by the superintendent of public instruction of the state, and will work under his direction. The examination papers written by such students are to be preserved for two years, and the committee's certificate to the effect that the holder has been credited by it with not less than fifteen high school units, shall be deemed as of the same value as a diploma or a certificate from a secondary accredited school.

Section 9 is amended so as to make it in accord with the present system of the state's business administration. It directs the board to turn its funds over to the state treasurer instead, as under the present dental law, of retaining them and disbursing them by the board. The amendment also provides for the employment by the board of a person, or persons, to investigate complaints made to the board against illegal practitioners.

Section 11 is amended so as clearly to define how reciprocity with other states may be established. It gives the board authority to arrange for the establishment of reciprocal relations, but eliminates practitioners of foreign countries from this arrangement.

Section 12 is amended by leaving out the words "foreign countries."

Section 13 is amended by leaving out the word "foreign countries."

These omissions regarding reciprocity to foreign countries have been needed; first, because the establishment of such reciprocal relations with foreign countries is thought to involve the right of making treaties with foreign nations, which is not part of the function of the state, but reserved to the United States; and second, because no foreign country has indicated any desire to extend the privileges involved to the dentists of this state, or of the United States.

Your committee earnestly recommend that a resolution be passed at an early date in our society's present session, endorsing the amendments proposed, and that copies of the same be forwarded to the Governor, to the President of the Senate, the Speaker of the House, Senator Austin and Mr. Igoe.

All of which is respectfully submitted.

Committee:—

T. P. DONELAN,
G. WALTER DITTMAR,
TRUMAN W. BROPHY,
JAMES E. KEEFE,
CHARLES R. E. KOCH, Chairman.

A copy of the proposed bill is herewith appended:*

Introduced by Senator Austin, April 14, 1915.

Read by title, ordered printed and referred to Committee on Judiciary and Judicial Practice.

A BILL.

For an Act to amend an Act entitled, "An Act to regulate the practice of dental surgery and dentistry in the State of Illinois, and to repeal certain Acts therein named," approved June 11, 1909, in force July 1, 1909, by amending sections 3, 4, 9, 11, 12 and 13 thereof.

Section 1. Be it enacted by the People of the State of Illinois, represented in the General Assembly: That an Act entitled, "An Act to regulate the practice of dental surgery and dentistry in the State of Illinois, and to repeal certain Acts therein named,"

*This bill is now a statute of the state of Illinois, having passed both houses and received Governor Dunne's signature.

approved June 11, 1909, in force July 1, 1909, be and the same is hereby amended by amending sections 3, 4, 9, 11, 12 and 13 thereof, so that said sections shall read when amended as inserted at length herein.

Sec. 3. No person unless previously registered or licensed to practice dentistry in this State at the time this Act shall become operative, shall begin the practice of dentistry or dental surgery, or any branches thereof, without first applying for and obtaining a license for such purpose from the Illinois Board of Dental Examiners. Application shall be made to said board in writing, and shall, in every instance, be accompanied by the examination fee of twenty dollars (\$20.00) together with satisfactory proof that the applicant is of good moral character and twenty-one years of age or over at the time of making the application. An application from a candidate who desires to secure a license from said board to practice dentistry or dental surgery in this State shall be accompanied by satisfactory proof that the applicant so applying for a license has been engaged in the actual, legal and lawful practice of dentistry or dental surgery in some other State, country or territory for five consecutive years immediately prior to such application; or is a graduate of, and has a diploma from, the faculty of a reputable dental college, school or dental department of a reputable university. When such application and the accompanying proof are found satisfactory, the board shall notify the applicant to appear before it for examination at a time and place to be fixed by the board. Examinations shall be made in writing in all theoretic subjects. Both theoretic and practical examinations shall be of a character to give a fair test of the qualifications of the applicant to practice dentistry or dental surgery. The examination papers and all grading thereon, and the grading of the practical work shall be deemed public documents, and preserved for a period of not less than two years after the board shall have made and published its decision thereupon. All examinations provided for in this Act shall be conducted by the board under fair and wholly impartial methods.

Sec. 4. Said Board of Dental Examiners shall make rules or regulations to establish a uniform and reasonable standard of educational requirements to be observed by dental schools, col-

leges, or dental departments of universities, and said board may determine the reputability of these by reference to their compliance with said rules or regulations.

The State Board of Dental Examiners shall demand of all applicants for license to practice dentistry, evidence of preliminary education before they were admitted to reputable dental schools, colleges, or dental departments of reputable universities, and require satisfactory proof of the observance and enforcement of such preliminary educational requirements by said dental schools, colleges, or dental departments of universities: Provided, that a certificate of admission, without conditions, to any colleges of Liberal Arts department of an accredited university, which demands not less than fifteen (15) high school units for admission, or the diploma of a high school or equivalent secondary school accredited by any State University requiring a course of not less than four years of attendance, and not less than fifteen (15) high school units of satisfactory work for graduation; or a certificate of having passed a satisfactory examination conducted, or approved by a committee on examinations herein provided for, acting in the State of Illinois, to the amount of fifteen (15) high school units in the studies embraced in a high school curriculum, shall be considered satisfactory evidence of preliminary education: And, provided, further, that the superintendent of public instruction of the State of Illinois shall appoint a committee of three examiners, composed of educators of ability and reputation who shall be empowered to hold examinations of applicants for admission to dental schools, (under such regulations as he may prescribe) who have not regularly completed courses in secondary or high schools.

These examinations shall be held at stated periods and places in the city of Chicago, and elsewhere if desirable. They shall be conducted in writing, and the examination papers and markings thereon shall be deposited with the superintendent of public instruction, and shall be preserved for a period of not less than two years as public documents.

At each of said examinations there shall be present at least two of the members of said committee, and the certificate issued by said committee shall bear the signatures of not less than two members of said committee to make it effective; said certificates

of preliminary education shall enumerate the subjects in which the applicant has passed and for which he is given credit, and state upon its face whether the credit is given as the result of the examination or for work previously done and accepted upon credentials. Said committee shall collect from each applicant taking such examination a fee of ten dollars (\$10.00) which shall be in full payment of the services and personal expenses of the members of the committee, provided the superintendent of public instruction shall prepare and furnish the necessary blanks and certificates. Provided, however, that nothing in this Act shall be construed to prevent any dental school which may desire to do so from establishing for admission a higher standard of preliminary education than is specified in this Act.

Sec. 9. The said board shall charge each person applying to it for examination for a license to practice dentistry or dental surgery in this State, an examination fee of twenty dollars (\$20.00) and in addition thereto a license fee of five dollars (\$5.00) for every license or duplicate license issued by said board.

Said board shall make an annual report of its proceedings to the Governor by the 15th day of December of each year, together with an account of all moneys received and paid out by them, pursuant to this Act. All fees, penalties, forfeitures or fines received and collected by the board shall be paid monthly by secretary of said board to the treasurer of the State of Illinois.

For their services, the members of the board shall receive as compensation the sum of ten dollars (\$10.00) for each day actually engaged in the duties of the office and all legitimate and necessary expenses incurred in attending the meetings of said board; Provided, that the secretary of the board, for the purpose of enforcing the provisions of this Act, shall receive a salary to be fixed by the board, instead of a per diem of ten dollars (\$10.00).

Said board is hereby authorized to engage a suitable person or persons, to assist the board in the investigation of complaints filed with said board against illegal practitioners or other violators of this Act.

The expenses of maintaining the board shall be paid from the State treasury upon vouchers signed by the secretary and president of the board, when properly approved in conformity to law, out of the funds accruing to the State treasury under the

provisions of this Act, or such funds as are available for the payment of such accounts.

Sec. 11. Any dentist who has been lawfully licensed to practice in another State or Territory which has and maintains a standard for the practice of dentistry or dental surgery equal to that now maintained in this State, and who has been lawfully and continuously engaged in the practice of dentistry for five years or more immediately before filing his application to practice in this State and who shall deposit in person with the secretary of the board, a duly attested certificate from the Examining Board of the State or Territory in which he is registered, certifying to the fact of his registration and of his being a person of good moral character and of professional attainments, may, upon the payment of a fee of twenty-five dollars (\$25.00) and after a satisfactory practical examination demonstrating his proficiency, be granted a license to practice dentistry in this State, without being required to take an examination in theory. Provided, however, that no license shall be issued to any such applicant, unless the State or Territory from which such certificate has been granted to such applicant shall have extended a like privilege to engage in the practice of dentistry within its own borders to dentists heretofore and hereafter licensed by this State, and removing to such other State; and provided further that the Illinois State Board of Dental Examiners shall have power to enter into reciprocal relations with similar boards of other States whose laws are practically identical with the provisions of this Act.

Sec. 12. Any one who is a legal and competent practitioner of dentistry or dental surgery in the State of Illinois, and of good moral character and known to the Board of Dental Examiners of this State as such, who desires to change his or her residence to another State or Territory, shall, upon application to the Board of Dental Examiners, receive a certificate over the signature of the president and secretary of said board, and bearing its seal, which shall attest the facts above mentioned, and giving the date upon which he was registered and licensed.

Sec. 13. The fee for issuing a certificate to a legal practitioner of this State, under section 12 of this Act, shall be five dollars (\$5.00), and in each case the fee shall be paid before the certificate shall be issued.

REPORT OF THE PUBLIC SERVICE COMMISSION OF
THE ILLINOIS STATE DENTAL SOCIETY.*

BY HARRY F. LOTZ, D. D. S., CHAIRMAN, JOLIET, ILLINOIS.

Owing to the fact that the time of holding the annual meeting of the Illinois State Dental Society was changed to March 23-26, 1914, joining with the Chicago Dental Society in the 50th Annual Meeting (the Golden Jubilee Meeting) the Public Service Commission for the years of 1914 and 1915 was not appointed until June, 1914.

The commission immediately organized and proportioned the work as follows:

The Toothache film purchased in 1913 was placed in charge of Dr. Guy F. Corley, of Mattoon, with the understanding that his territory for service was all the state outside of Cook County.

Dr. George N. West was given custody of the Toothache film purchased in February, 1914, with the request that he serve territory in Cook County.

The State Society at the request of the Public Service Commission, purchased from Underwood & Underwood of New York, a set of thirty-six slides and twenty-seven pages of descriptive outline manuscript of a lecture on "Care and Use of the Human Mouth," which was gotten up by the National Mouth Hygiene Association.

This lecture outline and slides was in care of Dr. W. A. McKee of Benton, until February 15th, 1915, for service to the following component societies:

Central Illinois.	Morgan.
Champaign-Danville.	Sangamo-Menard.
Eastern Illinois.	Southern.
Logan.	St. Clair.
Macon-Moultrie.	Wabash River.
McDonough-Fulton	Madison.

After February 15, the lecture outline and slides were in the hands of Doctor P. A. Pyper of Pontiac, for service to the other component societies, while to the chairman of the commission,

*Read before the Society, May, 1915.

fell the task of supplying speakers for public meetings, and clinicians to component societies, upon request.

The films have been viewed in the following cities: Paris, Mount Carmel, Plano, Joliet, Oblong—in Chicago at, Clarke Public School, Mark White Square Public School, Harrison Technical High School, Budlong School and Nicholas Senn High School.

The lecture outline and slides on "Care and Use of the Human Mouth" have been used by Dr. G. M. Livesat, Carbondale; Dr. R. C. Osten, Plano; Dr. S. P. Boyer, Taylorville; Dr. P. A. Pyper, Pontiac; Dr. J. B. Crist, Golconda; Dr. W. A. McKee, Benton; Dr. J. J. Donelan, Springfield; Dr. F. C. Bailey, Fairfield; Dr. A. B. Applebee, Jacksonville; Dr. J. R. Blayney, Tallula; Dr. J. S. Reece, Bloomington; Dr. J. D. Wilson, Danville; where they were used seven times before school audiences. Dr. P. A. Pyper at Joliet, before Public Health and Safety First Exhibition; by Dr. P. A. Pyper at Lockport before the Parents and Teachers Association in the Lockport Township High School; by M. J. Jones, executive director of the National Mouth Hygiene Association at Joliet; by Dr. P. A. Pyper at Fairburg before entire school in the opera house; by Dr. P. A. Pyper before Peoria Dental Society in Peoria.

The committee cannot too strongly endorse this line of educational work. In the words of one who is qualified to speak on the subject, "I think this set of slides is the most complete for general hygiene work I have ever seen. The lecture outline is in detail, invaluable, and gives one a chance to balance his own opinions with those of experience and ability, who have compiled such work. I do not think the lecture is suited verbatim to every audience. To read any stereopticon lecture loses its value. The value of those slides depends upon the lecturer. The success depends upon the ability of the lecturer to put personal magnetism into his audience."

The slides are well selected for school children and especially for mothers, school teachers and school directors, if the lecturer will emphasize the slides best suited to his particular audience. If you will excuse the personal reference, I never received so many compliments from any work I have ever tried to do, as I have received from those who listened to me while talking about the slides. I never gave anything that the audience seemed

to comprehend and understand the good of the purpose so well.

In reference to the Toothache film, of which the Society has two, it is the opinion of the Commission that the film for use down state should be placed with some Educational Film Co., and in their education circuit work and let it take its chances the same as other educational films. The Commission feels that the success we have had in the past, has been due to the curiosity of the profession more than any real interest which they have in its educational value. We believe that this curiosity is rapidly wearing away and that each year will make it more difficult to handle films to advantage. The time is rapidly going by when we can hope to receive much revenue from this film, and the Commission would recommend that in the future this phase of educational work be conducted without any thought of revenue.

The Toothache film for use in Cook County has never produced one cent of revenue and it is the recommendation of the Commission that the film be placed at the disposal of the Chicago Tuberculosis Institute for use in social centers, schools, the Sportsman's Club, and any other educational gatherings which might wish to use it.

Public meetings were held over the state as follows: Carthage, with Dr. J. P. Buckley as lecturer. Dr. Buckley reports giving two lectures, one to the high school children, and the other under the auspices of the Woman's Civic League. Both meetings were well attended. "I was especially pleased with the latter meeting, for I think it was the largest audience of adults that I have ever lectured to at any place. The hall was literally packed and all present were women, with perhaps two or three dozen of men. On the whole, I was as well pleased with this trip as with any that I have ever made under the auspices of the Commission." Members of the profession may think this is too personal to go into a report, but we feel that this is just the kind of a report you should hear.

Charleston, with Dr. W. H. Barnfield as lecturer, given before the Teachers' Institute of Coles County. He also lectured to the Mothers' Club on Oral Hygiene.

Arlington Heights, with Dr. A. J. Nichols as lecturer.

Joliet Steel Works' Club, with Dr. J. P. Buckley as lecturer.

Springfield, with Dr. F. E. Roach as lecturer.

Jacksonville, with Dr. H. A. Potts as lecturer.

Golden, with Dr. F. F. Molt as lecturer.

Mt. Carroll, with Dr. Darby as lecturer.

Marion, with Dr. J. F. F. Waltz as lecturer.

Peoria, with Dr. E. D. Coolidge as lecturer.

Peoria, with Dr. A. D. Black as lecturer.

Also many lectures were arranged by members outside of the Commission.

Early in the year's work the Commission made application to Dr. W. G. Ebersole of Cincinnati, secretary of the National Mouth Hygiene Association, to form an auxiliary in some city in our state. Decatur was decided upon, and Dr. J. F. F. Waltz, Miss Anna C. Trumble, supervisor of hygiene in Decatur public schools, were interested. Dr. Ebersole wrote under date of Oct. 19, that our state society was the first to make application for an auxiliary organization. Mr. M. J. Jones, executive director of the association, made a trip to Decatur. Soon after this health conditions were such in Decatur that it was inadvisable to proceed, so the campaign was transferred to Joliet.

As a preliminary campaign, Dr. Buckley came to Joliet and addressed an audience at the Steel Works' Club. Later the Central Health Council and local council of Safety First, organized a health and Safety First Show, which ran nine days. An evening was given over to dentistry. Dr. C. N. Johnson came from Chicago to preside. Dr. W. H. Wiley, Dr. W. G. Ebersole and Mr. Myron J. Jones, after addressing a noon day luncheon meeting at the City Club in Chicago, came to Joliet to address a large audience at the Health and Safety First Show. An auxiliary was formed with the Will-Grundy County Dental Society, the Will County Medical Society and the Joliet Rotary Club. A large membership was secured and we are looking forward to seeing the service spread out over the state, for it is one of the first steps towards school inspection.

The Toothache film was run during the Health Show and some 20,000 viewed it.

This report would not be complete without mentioning that through the influence of Dr. J. D. McMillian and others, the school board at Macomb adopted school inspection.

This is the kind of work we hope the Commission will develop for next year.

The Commission wish to mention the work done by the dentists of Springfield in helping with the survey, conducted through the Russell Sage Foundation, which eventually gave Springfield a free dental clinic. This is another line of work which future Commissions might help develop.

Dr. F. F. Molt, acting for the Health Department of the City of Chicago, placed at the disposal of the Commission some 30,000 sets of triplicate dental blanks which can be used in school inspection work out in the state. I hope those wishing free blanks will write Dr. Molt.

Respectfully submitted,
G. F. Corley,
W. A. McKee,
P. A. Pyper,
G. N. West,
H. F. Lotz, Chairman.

MATERIA MEDICA AND THERAPEUTICS; RATIONAL OR EMPIRICAL, WHICH!*

BY C. M. CAHILL, PH.G., D. D. S., CHICAGO.

Mr. President and Members of the Society:

I confess that it is with no small amount of timidity that I attempt to address this audience. Never before has the beauty of Lowell's new Beatitude, "Blessed are they who have nothing to say, and who can't be persuaded to say it," appealed to me so strongly.

Since I am to take up the "White man's burden" of talk, I call your attention to the fact that we are admonished in Holy Writ "To prove all things; hold fast that which is good." Evidently rational truth was as earnestly sought thousands of years ago as is it today. I think we are agreed that not only in the religious and political world today, but in the professional world, as well, empiricism and dogmatism are rapidly giving way to

*Read before the Illinois State Dental Society, May, 1915.

rationalism. In the medical world of today, drugs, remedies or agents of known value in the treatment of any given disease are rapidly taking the place of the old-time "a little of this, a little of that and some more of the other,"—shot gun prescription. It is rational treatment, if you please, rapidly superseding empirical treatment.

Having nothing strange, new or particularly startling to divulge, I will attempt to defend a few of the drugs, remedies or agents that may be used rationally for the good of all concerned and that I fear often are used empirically, hence more or less discouragingly. I shall attempt to answer a few queries I have received; to confess some of my failures, and to hope sincerely that they may be more profitable to think of than pleasant to talk about.

He practices with greatest success, who practices with greatest ease. Likewise, he practices with greater ease who possesses the greater knowledge of the agents he employs. I am unalterably opposed to the using of any drug or combination of drugs, by any practitioner who does not possess a full and complete knowledge of the same. I do not mean that he should be able to analyze the various compounds he uses. I mean that should he purchase "All Con" for treatment of some particular malady, he should know before using it that the product consisted of hydrogen and oxygen in certain definite proportions.

The manufacturers—pharmaceutical chemists—are employing a scientific corps of physiologists, bacteriologists and pharmacologists of no mean abilities, who are continually testing the therapeutic value of drugs, remedies or agents whose chemical and physiological actions are known quantities. The results of their labors are at our disposal. The constituents of their remedies we may know. Neither drugs nor men are infallible. Hence a comprehensive knowledge of the agent used is of prime importance if successful results are to be hoped for. A man of very excellent ability as an operator once asked me why he "was having such unhappy results in bleaching a tooth with sodium dioxide?" Unfortunately this gentleman did not know sodium dioxide was a powder of a lemon-yellow color, with an amorous affinity for hydrogen, and he was trying to bleach with sodium hydroxide, a very good saponifying agent.

Perhaps you ask your druggist for an ounce of eucalyptol; druggists show their fallibility by sometimes substituting what they have, for that which you want. This one may happen to have on hand oil of eucalyptus. The former (eucalyptol) is almost colorless, possesses no resinous compounds and is in a degree less irritating than the latter, (oil of eucalyptus) which is of a yellowish color.

Formalin (U. S. P. not less than 37% aqueous solution of formaldehyde gas), an agent both well and favorably known by the profession, has and will continue to come in for its share of criticism very largely on account of a failure to comprehend it, or to mix brains with its use. It is a volatile substance, caustic and corrosive to soft tissue—on this account seldom used to disinfect hypodermic syringes or needles. On account of its caustic, as well as its volatile nature, in my opinion, this drug or any combination of which it is a part, when used should be sealed in the cavity with cement. There are two reasons for this: temporary stopping, or any compound the base of which is the product of *dicopsus gutta* (the gutta tree) changes its form under pressure, thus allowing some of the volatile agent to escape. Of far greater importance, however, is the fact that pressure on soft dressings causes the agent to be forced beyond the apices of the teeth. The result is always a sore tooth, very often a loose one and in such a condition, a case for extraction. That lesson, to my sorrow, I learned some thirteen years ago. Whilst I am of the opinion that for abscesses and putrescent pulps it is the treatment *par excellence*, I am equally positive that when combined with any organic or inorganic base and used as a root canal filling it will prove a failure. If the root or roots are by chance perfectly filled, a sufficient quantity of the formaldehyde will be present to prove very irritating. A *pericementitis* follows that is difficult to treat and discouraging in the extreme. More often, however, the combination used fills about two-thirds of the root canal. In such cases, trouble is bound to come, but seldom returns to the original operator. This is most unfortunate, as it affords one no chance to learn of his failures. I believe this condition to be very largely responsible for the unjust criticism we, as a profession, are receiving from certain sections of this country, resulting in an unnecessary loss of pulpless teeth. I have

some pulpless teeth that have been giving me perfect service and satisfaction for a quarter of a century. If I happen to hang around another quarter, I expect to keep them, if for no other purpose than to prove the fallacy of the opinion that "pulpless teeth should be extracted."

During the past year I have treated abscessed teeth, both multiple and single rooted, to the number of sixty-three that had previously been partially filled with some one or other of the various short-cut, easy method, sure-fillers that are on the market. The literature accompanying these various abscess cures and root canal fillers is so alluring, and the guarantee so assuring that one seldom finds that a gutta percha cone has been used to assist in making sure that the canal has been filled.

I have found in several cases druggists substituting lysol (liquor cresolis compositus) for tricresol. Tricresol is a refined mixture of cresols obtained from coal tar, purified and freed from phenol, hydrocarbons and water, whilst lysol is a linseed oil soap solution of cresol 50% strength. When lysol has been substituted for tricresol in the cresol-formalin compound a muddy looking product is the result. If you use this compound, insist upon getting tricresol. In the phials you are examining you will have no difficulty in recognizing the substitution product. Also note the heavy oil of terp. odor of the oil of eucalyptus, which is absent in the one containing eucalyptol.

Again, may I remark that whenever and wherever formaldehyde, or the powder, paraformaldehyde is used, or any combination of the same, the greatest care should be used to insure its having been securely sealed in the cavity. Omitting phosphorus, (burns from which, few if any dentist will be called upon to treat), formaldehyde burns are the most serious I have seen. Upon the soft tissue its action resembles arsenious acid. When presenting for treatment, formalin necrosis is equally difficult and if anything more discouraging to treat than necrosis due to a failure to seal thoroughly arsenic trioxid in a cavity. In necrosis resulting from either of these agents, the process of destruction is so quickly and so completely accomplished that removal of the necrotic area and the keeping of the parts in as thoroughly aseptic a condition as is possible is all that can be done.

Having introduced our friend arsenious trioxid into the

subject, there is a condition arising from its use, occasionally the fault of the dentist, but far more often the patient is to blame. I refer to the case where devitalizing paste has remained in teeth sufficiently long to cause an arsenical pericementitis. In my opinion, there is no drug, remedy or agent that will in any way compare with oleum carophylla—oil of cloves. It matters not how loose or how tender to pressure the tooth, if you will, with softened modelling compound, fix the tooth in question firmly to several of its adjacent members, you may proceed to expose the pulp chamber in its entirety and remove contents. Having done this, carry, on a smooth broach, or any suitable instrument, a drop or two of oil of cloves as far into the canal as is possible. By means of hot air, volatilize this. Repeat this several times. Carry cotton fibres into the canal or canals, and after moistening a pledget of cotton with this agent, cement it in the pulp chamber. With this condition presenting, I am positive that this will prove the happiest agent at your command. Doubtless, in any case of non-septic pericementitis, counter-irritation is of value. However, when counter-irritating, *counter irritate*. When using "A. B. C. Liniment" (aconite, belladonna and chloroform), aconite, iodin and chloroform, or any form of a dental liniment, the agent should be applied directly over the tooth or teeth affected—the soft tissue thoroughly dried before applying remedy, and blasts of warm air following its application. Too frequently we see evidence of attempting to counter-irritate from one-third to one-half of one's maxilla. Occasionally a patient is "given some in a bottle to put on while at home." This, in my opinion, is as useless as well as a foolish thing to do.

Sulphuric acid, as well as phenol-sulphonic acid are frequently used either to enlarge tortuous root canals or remove shreds of pulp tissue. They are both valuable agents, and both often contributing factors to loosened and continuously tender teeth. Whenever used, one should feel certain that entire neutralization has taken place before attempting to fill the canals. It has been my custom for some years to seal in an alkaline solution (sol. sod. bicarb.), for a period of twenty-four hours after using either of the above agents, insuring entire neutralization before making an attempt to fill the canals. Only once in the use of these agents, did I forget to "make haste slowly." That

once, however, will be a source of regret to me so long as I shall practice dentistry.

In the light of present knowledge concerning the treatment of pyorrhea alveolaris, I share with others the opinion that no drug, remedy or agent has been proven a specific. Nor do I expect we shall have one, until the cause is established beyond a reasonable doubt. Whether or not the endameba is the guilty party, or whether he is merely foraging 'round for a proper pabulum necessary to his existence, is a mooted question. His actions certainly are bactericidal. He is found in edentulous mouths as well as in mouths where no pyorrhoea exists.

In my hands, when vaccines have been used, success has been more uniform where autogenous vaccines have been employed than where I used stock vaccines. I am not only willing, but glad to co-operate with the medical fraternity wherever I can be of assistance to a patient. However, since the advent of emetin hydrochlorid, some physicians are sending their patients to a dentist with instructions "have your teeth cleaned and return to me for pyorrhea treatment." This, in my opinion, is not a square thing to do.

There is being marketed "Emetin Hydrochlorid" and fifty-seven varieties (more or less) of other alkaloids combined. Also this injunction; "Using this preparation, doctor, scaling and polishing is not only unnecessary, but useless." In my opinion, this doctrine is not only all wrong, but pernicious.

I sincerely hope that in showing a few of the common errors made in the use of a few drugs, and the ways and means devised to unload for money, remedies of little or no use, I have been able to render some little service, and I thank you.

CYSTS.*

BY TRUMAN W. BROPHY, M. D., D. D. S., LL. D., Sc. D., F. A. C. S.,
CHICAGO, ILL.

A cyst is a sac containing fluid, or a semi-fluid substance, which may be gelatinous or inspissated. In the broadest sense, a cyst may contain mucus, saliva, bile, urine, etc., depending upon

*Read before the Odontological Society of Chicago, May 4, 1915.

the organ with which the cyst is associated. Formerly, cysts were classified under the head of tumors, but the advancement of pathological knowledge has excluded them from that classification. A tumor is a neoplasm, a multiplication of cells; a cyst is a sac or cavity containing a fluid. Cysts, however, may be associated with neoplasms. Pressure made by their presence may, as a local irritant to the surrounding parts, cause multiplication of cells and the consequent development of new growths. Again, cysts may be developed in bone, connective tissue or in any organ of the body by a dilatation from causes sometimes impossible to comprehend.

There are some conditions which seem to be cysts: pseudocysts, as diverticula, bursa and neural cysts.

From the standpoint of the oral surgeon, the class known as retention cysts is the most important, as most frequently he meets them.

A cyst is not necessarily a single cavity or sac. Cysts may be multilocular. The walls are made up of various structures and the fluids differ in composition. Accumulations in the tissues are mainly myxomatous or colloidal, a dropsical or edematous, swelling preceding its formation. It may be due to fatty degeneration of the connective tissue. Usually cysts are preceded by inflammatory processes. Fatty degeneration is the result of diminished blood supply, a change in the composition of the blood or a lowering of the vitality of the cells. The fat globules are present in dermoid cysts, sometimes crystallized into cholesterin. Rupture of blood vessels may be the origin of cysts.

RETENTION CYSTS.

The mouth, jaws and associated parts are frequently the seat of cysts. For practical purposes, we may say that cysts form, first, in the natural cavities of the body and, second, by pressing apart normal tissues where cavities did not exist previously. The simplest form of cyst is to be observed upon the surface of the oral mucous membrane. A minute duct leading from a gland, having been obstructed, dilates under pressure of the accumulating mucus until it becomes greatly distended. It is to be seen as a papule or blister. This is a typical muciparous cyst. A retention cyst, therefore, is caused by the obstruction of the free

flow of the secretions. On a larger scale, the purest form of a retention cyst is to be found in the ranula (so called because of the resemblance to the belly of a frog). This is the formation of a cyst of Wharton's duct, due to the obstruction of the passage of saliva from the submaxillary gland at the point of exit beneath the tongue.

On the skin we find a simple form of cyst following a contusion or bruise—oftentimes in the hands from rowing or any other manual effort which produces friction and an accumulation of serous fluid beneath the skin. In these cysts we have circumscribed cavities containing fluid, though in a recent contusion there is no well-defined cystic wall. Absorption of the fluid rapidly follows the injury and recovery soon takes place. This is an edematous condition. The distinction between it and a typical cyst is that the cyst has a membranous wall while the contusion or edema is due to the infiltration of serous fluid into the connective tissue.

The lining of a cyst is either epithelium or endothelium, in accordance with the tissues in which it originates. From a clinical point of view, we speak of epithelial cysts, which are due to the distension of ducts or epithelial cavities caused by the obstruction of their orifices by inflammatory processes, and, since the fluids within the glands or ducts cannot escape, they are also termed retention cysts. In the mouth we find them associated with the mucous and salivary glands. They may be found in the skin, kidneys, intestines, uterus and mamma. A glandular cyst generally has a well defined lining. The lining may undergo fatty degeneration or, by reason of its distention, it may resemble a serous membrane.

It is essential to make a distinction between an uncomplicated cyst—a cyst pure and simple, a sac containing a fluid around whose walls a neoplasm has not formed—and one around which a well-defined growth exists. To the latter condition, the term cystoma may well be applied since we have not only a cyst, but, associated with its walls, a neoplasm and, according to Senn, this wall is made up of a matrix of misplaced embryonal cells. The location of the cyst and the part with which it is associated, leads us to refer to them as mucous cysts, serous cysts, salivary cysts,

blood cysts, fatty cysts, etc. The epithelial or retention cysts contain mucus and saliva. The endothelial or exudation cysts contain lymph, serum, etc. Those in connection with bone have a mixed content.

Cysts are simple and compound; simple, if having a single cavity; compound if having numerous cavities communicating with one another. A simple cyst is also known as unilocular; a compound, as multilocular.

PATHOLOGY OF CYSTS.

Cysts may vary in size from a most minute papule to enormous proportions. The membrane forming the wall of a cyst throws out an exudate and, by this means, the cystic contents increase and the pressure upon the surrounding walls causes the absorption of the tissues with which it comes in contact. In the case of a salivary cyst, the physiological accumulation of saliva rapidly swells the cystic cavity and the pressure upon the surrounding parts may cause a raising of the tongue, absorption of the tissues beneath it, distention of the floor of the mouth and of the tissues beneath the angle of the jaw by reason of the dilatation of the submaxillary gland, until a marked deformity is visible. The secretion of saliva, however, if the orifice of the duct is obstructed and the passage of saliva into the mouth is no longer possible, takes place more slowly than would be anticipated. Unquestionably, the unaffected salivary gland takes on greater activity and secretes a greater amount of saliva than each would do if all glands were performing their functions naturally, and as a consequence, the dilation of the duct and the formation of a cyst is rather slow in its development.

The pressure upon the walls of the cyst may not only involve the duct itself, but cause a dilatation of the lobules of the gland, whose substance may undergo disintegration. The tissues of the salivary glands are not infrequently filled with calcareous deposits, the epithelial membrane itself disintegrating by reason of pressure and irritation. The contents of the cysts, therefore, will be stained with blood, giving to the exudate a dark brown appearance. On the other hand, the irritation may produce hypertrophy of the membranes until they have become so thickened and unyielding that the pressure of the continually increasing fluid may cause severe pain.

Cystic walls may break down from fatty degeneration, or they may, by reason of infection, undergo disintegration. When calcerous formations take place in the substance of the glandular tissue, general disintegration of the gland usually will ensue. It is by reason of this irritation of the membranous walls of the cyst that neoplasms are induced. The considerations of these morbid changes will be taken up under the treatment of cysts.

The contents of a cyst change with its age. In a mucous cyst we find, when opened, that the mucus is thick and honey-like. In a salivary cyst, or ranula, the contents, instead of being like colorless saliva, are oftentimes amber colored, sometimes brown. When of long standing, the contents escaping are tenacious and ropy.

DENTIGEROUS CYSTS.

A dentigerous cyst has for its nucleus a tooth or teeth. It may develop around masses of tissue composed of tooth structure, some of which resembles normal teeth while others, called denticles, are irregular in size and form. The nucleus may be a single tooth or denticle, or the cyst may contain many teeth or denticles. Normal permanent teeth are most frequently involved in these cysts, but imperfectly formed teeth, supernumerary teeth and denticles, many of which are shapeless, are often the center of irritation about which the cyst forms. Deciduous teeth are seldom associated with dentigerous cysts. Only twelve such cases have come under the author's observation. They are located in the cancellated structure of the body of the bone.

Normally, the teeth emerge from their bony crypts and take their places in proper alignment in the dental arch. If impossible to erupt, from any cause, these aberrant teeth remain imbedded in the bone and the irritation caused by their pressure upon the tissues, in nature's efforts to erupt them, is often followed by an accumulation of fluid, varying in quantity according to the size of the cyst. An incipient dentigerous cyst might be quickly and easily cured by relieving the pressure of the erupting tooth. Non-erupted, impacted teeth, however, may remain in the bone through life without causing the slightest inconvenience.

The maxillae are more frequently the seat of dentigerous cysts than the mandible. In order of frequency, molars are first involved, followed by cuspids and bicuspid. Any tooth, how-

ever, may be the nucleus of a dentigerous cyst. The epithelium which dips down deep in the submucous tissue to form the tooth enamel, the dental follicle, becomes the cystic wall or membrane. Recognizing this fact, Bland-Sutton designates them "follicular odontomes." The wall varies in thickness and is an expanded tooth-follicle. The contents of the cyst, besides the tooth, teeth or denticles, is a viscid, stringy fluid often containing cholesterin. Dentigerous cysts sometimes attain enormous size.

Cysts of the jaws which result from chronic abscesses are not dentigerous cysts. Such cysts have a periosteal wall. Like dentigerous cysts, they increase in size, the surrounding bone is absorbed, the surfaces often become thin and crackle on digital manipulation. Extensive loss of bone by absorption may take place in a dentigerous cyst, due to the pressure of the fluid. Dentigerous cysts seldom cause pain. Any pain attending them is due to pressure upon adjacent nerves. I have seen a patient whose entire left maxilla, save only the alveolar, malar and nasal processes, was destroyed by a dentigerous cyst, who asserted she never had pain from the condition. Except in extreme cases there is little redness over the cyst. Dentigerous cysts seldom contain pus. These cysts may occur at any age, but more frequently in youth, rarely appearing after the thirtieth year. They are slow in developing.

DIAGNOSIS.

Absence of any of the permanent teeth suggests that the absent tooth may be the cause of the cyst. The absent tooth, however, may have been extracted. Patients' statements regarding the extraction of teeth are not always reliable, as they may forget.

On digital manipulation, crepitation of the thin bony wall will be noted in advanced cysts. Small lamina of bone, left by absorption of the intervening thin portions, like islands of ice upon the water in the springtime, come in contact on pressure, producing the characteristic crackling sound. Palpation reveals the pressure of the fluid which may be withdrawn by an exploring needle and examined. It is very important to use the exploring needle to determine the character of the fluid, as a cyst may simulate an abscess or an aneurism. Calcareous deposits are occasionally found in the cyst. The advent of Röntgen photog-

raphy placed at our command the most reliable means of making a positive, accurate diagnosis. Tumors of all kinds and empyema of the antrum should be excluded. Transillumination and good Röntgen photographs will determine the diagnosis.

TREATMENT.

The treatment of a dentigerous cyst consists in opening it, intra-orally, removing its contents, including a tooth or teeth, together with the investing membrane. It is essential to remove every portion of the membrane surrounding the cyst in order to avoid a recurrence.

When the bone is thin and parchment-like, it may be, by compression, returned to its normal position, and the external deformity removed. If, however, the bone is thick and unyielding, it may be necessary to excise it or break it and carry it back to its normal position. It is necessary, however, to maintain an opening so as to promote the formation of granulations within the cystic cavity with a view to filling it up. The opening should be packed with iodoform gauze, which should be changed and the cavity irrigated every forty-eight hours, for a week. After this the gauze should be removed, the cavity irrigated, and a gutta percha plug made to maintain a large opening. The plug is easily removed two or three times a day for the irrigation of the cavity, thus keeping it free of irritating secretions. If the wound is permitted to close before the cavity fills with granulations, recurrence of the cyst is almost certain to follow. The walls of the cavity may be scarified from time to time so as to more rapidly promote the formation of granulations. The plug should be made use of as long as may be necessary to retain the opening, and until granulations have filled the cavity. The plug may then be reduced in size a little from time to time, by paring it down, as the cavity fills.

The most serious sequel of a dentigerous cyst is the absorption of the bone against which the cyst exerts pressure. As previously stated, the entire maxilla, even the nasal septum, may be destroyed by contact, pressure and absorption. In the development of a dentigerous cyst in the mandible, the deformity resulting in extreme cases may be irreparable. The entire body of the bone, from the cuspid tooth to the angle, may be absorbed in the

invasion of the cyst. A retraction of the mandible, with a loss of occlusion of the teeth on the opposite side, as in the case of a compound fracture, will result. In the absence of any bone, a prosthesis is essential. In such cases the osteogenetic powers of the periosteum may develop new bone, and the deformity may in part be overcome.

DERMOID CYSTS.

Dermoid cysts are developed by the infolding of the epiblast or hypoblast and are surrounded by connective tissue. Thus, buried in the tissues, they are capable of producing dermal appendages, such as hair, nails and teeth. Dermoid cysts are most frequently found in the generative organs, usually the ovaries. They may be found in the peritoneum, sternum, neck, cheek, mouth, about the orbit, in the median line of the palate, in fact, at any point where the skin closes in embryonal life.

Dermoid cysts are congenital. The late Prof. William H. Byford removed an ovarian cyst in which there were four hundred teeth, varying in size and containing all the different forms. Some were perfect incisors, cuspids, bicuspid and molars while many were irregular, not resembling in form any tooth. Some were cubiform, others were sharply curved and many were small clumps of irregular forms. Marshall speaks of a dermoid cyst of a horse, located in the temporal region, which was removed by Professor Sayre of the Chicago Veterinary College. This cyst had been discharging for several months and, when opened, was found to contain a well-developed incisor tooth. Dermoid cysts, though congenital, may not manifest themselves until middle or advanced life. They are slow of growth and painless except as they interfere by pressure with the surrounding nerves. They are accidents in development.

SYMPTOMS AND DIAGNOSIS OF DERMOID CYSTS.

There is little to be noted in the symptoms of the dermoid cyst. Very rarely is pain experienced. The first sign, usually, is a slight enlargement in the area affected. This continues gradually until, at the end of a term varying from a few months to several years, the enlargement attains a size sufficient to cause some inconvenience. At that time it may become painful from the irritation of the clothes, etc.

Rarely is the diagnosis difficult because of its location. It is always found close to the lines of skin closure in embryonal life. The skin over the tumor is freely movable and non-inflamed. The base of a dermoid cyst is always attached deeply to the underlying structures. The sebaceous cyst causes the most difficulty in making a diagnosis. The common location of both on the skin of the face and neck renders the diagnosis essential. The sebaceous cyst is always attached to the skin and is usually freely movable over the deeper structures. Lipoma and lymphangioma occasionally enter into the differential diagnosis.

TREATMENT OF DERMOID CYSTS.

The treatment of dermoid cysts calls not only for complete removal of the cystic fluid, but of the cystic walls. This must be accomplished thoroughly as the retention of a particle of the wall, though almost unobservable, may become the nucleus of a recurring cyst. It is frequently necessary to follow the cyst down to its attachment to the bone.

FACULTY ADDRESS.*

BY CALVIN S. CASE, M.D., D.D.S., CHICAGO, ILL.

Fellow Members of the Faculty, Members of the Graduating Class, Friends and Guests: It is my pleasure upon this happy occasion to speak for the faculty in wishing you of the graduating class of 1915 the greatest possible success in the career you have chosen, and to express the hope that the education you have received from your Alma Mater has given you a depth and breadth of vision so that you will know what kind of success to seek, and so that you will know how to follow the path which leads to the *real* success of the professions, unblinded by the allurements of ease and the thieves of time and progress. There is a deeper, better kind of success than financial remuneration. It has been my fortune and the fortune of others of this faculty in our special fields of practice to relieve many patients whose lives otherwise would have been a constant source of

*Delivered before the graduating class of the Chicago College of Dental Surgery June 1, 1915.

unhappiness and embarrassment to themselves and friends; but who now are able to take their places in society, unencumbered by that former condition, and endowed with all the hopes and possibilities which make life worth the living. If you imagine but for one moment that we count the dollars as success which we received for these services, or the dollars which we may receive for other similar services, however much it may be, you have a very poor conception of the real success of professional life. In the professions, wealth or even the easy competence, is not the great reward for faithful skilful work well done for the joy of the doing. To do the best you can at the time, to be the best you can at each point in your careers, to have a high regard for your profession and strive to live up to the best there is in it and in you, means that if you have all these things and do them faithfully and patiently, prosperity also will be added unto you. For it goes hand in hand with success, but it is not success in itself and cannot be sought alone.

You cannot measure success in terms of dollars, but you *can* measure success in terms of satisfaction, in terms of honest, skilful, appreciated work; in terms of memories, of lives you have helped to make useful and happy. You can measure it in terms of altruism and in terms of your own joy in life, because of the happiness and joy you have brought to those who are near and dear to you.

The majority of you have been with us now for a period of three years studying the splendid profession you have chosen, and this afternoon you can safely feel that you have reached the goal of your ambition which we call "Commencement," but which many people have grown to look upon as the end to which you were striving, as if the goal were at your feet, and your days of struggle were over. Believing this, they might regard you now as finished products of your profession, and lest you should take this same optimistic view of your present status, it perhaps behooves the faculty to remind you that your diploma was signed by us because we believe that you have given evidence of such progress in your training and have so faithfully pursued your work that the faculty think themselves justified in recommending you to the public as *capable of becoming* competent practitioners. And with these words "*capable of becoming*" you see the

goal which seemed so close at hand, with this gathering—and with the music and flowers to make it real—you see this goal melt into the future, that the race is just beginning, and that the Commencement Day is not a day of completion, but a day of beginnings.

So we are gathered today to watch the start of a new race, and we watch you take your place at the tape, and hear the ringing voice of the starter "on your marks," and hear the other cries of good wishes and God speeds that set you briskly on your way.

During your stay with us, you have been gathering and acquiring your equipment in your profession. You have gathered the tools of your craft well or less well, according to your character and your ideals. And the tools which we as a faculty have endeavored most to put into your heads and into your hands, are mainly the basic principles of the different departments which pertain to the practical side of your future every day practice. These we have endeavored to dwell upon and repeat many, many times, with an avoidance of extensive detail of intricate and unusual conditions in order that your minds might be free and unencumbered to more surely enable you to store up these broad and truthful principles into a solid foundation and framework for your future practice. But now, that which lies ahead on this Commencement Day, with the equipment that should be yours, is the great opportunity to achieve success by attaining real excellence in these branches you have begun so well within the walls of your training school. This is your chance. You have the equipment for success and now comes the test. You can make good if you will, but you must realize that your achievements must come from individual effort and that the work lies ahead; and in the earnestness and absorbing interest it will demand, your school days will soon look to you like a playtime.

There is no royal road to success. There is no infallible secret to be imparted, except as you seek it yourself, but I have sometimes thought as I have looked into your faces, that you regard success in those who have won it, as due to some gift from the skies, to some special talent or genius granted only to a few, whereas if I should tell you my inmost belief, it is, that success is largely a matter of grit and determination. It is be-

cause of those virtues which our old friend Teddy has called the "homely old-fashioned virtues of untiring industry, perseverance, patience, and unswerving honesty." Industry that does not count the cost, but keeps itself eternally busy about something that concerns your practice. Perseverance that regards an obstacle as something to be gotten over and has bull dog grip. Patience that can keep on striving with no thought of failure in spite of every obstacle. And last of the homely virtues, truth and unswerving honesty to yourselves, to your profession and your confreres, to your patients and the world at large.

When I was at the impressionable and somewhat romantic age of 18, a lady—the mother of the young woman who afterwards became my wife, and thank God still is my wife—gave me a volume of N. P. Willis' poetical works. And I want to say to you that the study of that book, not the mere perusal of it, but the committing of a large portion of it to memory, has been one of the greatest influences of my life toward the development and uplifting of my thoughts and aspirations to the higher planes. And this can be true of many a good book which deeply touches the purer well-springs of our natures, if we will but give the proper amount of thought and devotion to its teachings.

In the year 1831—nearly 100 years ago—N. P. Willis delivered the Doctorate address to the graduating class of Brown University; and much of that address—which is published in this book—has always clung to me; and there is one paragraph which I remember that has reference to the most important of these good old-fashioned virtues. It is this:

"Truth is *vitality*, and if the mind
Be fed on poison, it must lose its power.
The vision that forever strains to err,
Soon finds its task a habit; and the taste
That will own nothing true or beautiful
Soon finds the world distorted as itself;
And the loose mind which feeds an appetite
For the enticements of evil thought,
Contracts a leprosy that o'er steals
The senses like a palsey chill and fast."

You have *begun* the foundation of a career. Now you are ready to build. And if you are presevering and are content to master detail, and have patience to start at the beginnings, your superstructure can be bigger and better than any now in existence. You can be a more able practitioner than anyone now living, *if* you have it in you. By that, I mean if you have the foundation and can analyze success and seek it by the only road of the common old-fashioned virtues we have been talking about.

It will not come by self praise or self advertisement or by crying down the other man. It *will* come by putting the best that is in you into each small operation of the moment and putting it there without thought of reward.

About 20 years ago the late and beloved Dr. Geo. H. Cushing delivered the faculty address to the students of this college, and I am reminded of the story he told of Gen. Phil. Sheridan of Civil War fame, who, when asked by some of his comrades after the war, to what he attributed his success, replied: "Well, boys, I don't know, except that when I was first appointed a lieutenant, I said to myself, 'I will make just the very best lieutenant I know how,' and I did. And so when I was appointed captain, I said: 'I will make the best captain I can.' And so on with each promotion, I made the very best I could, and that is all I know about it." That sounds like a very simple recipe for the greatness of the man who took the famous twenty-mile ride to save his country and his cause, and who was the hero of the Shenandoah Valley.

On an occasion like this, to quote Dr. Geo. E. Vincent, "It behooves us to not only congratulate those who graduate, but with them to pledge *ourselves* anew to the larger, broader, richer life for which education in its best sense must always stand."

We as faculty members have recognized our obligation to you, to hold high the standards of our profession, to uphold its ethics so that in our intercourse with the public, and in our work with you here in the college, you receive from us only the impetus toward right thinking and upright conduct. Upon *us* devolves the obligation to uphold the standards of your Alma Mater, but upon *you* as individuals and practitioners rests the responsibility of acting as fair representatives of your training school to the outside world. *We* carry our burden here in a great busy city.

You scatter today far and wide like seeds snapped from a seed pod and scattered to the four winds. As seeds you are full of promise. Ask yourselves what you will become, when you really take root and grow. You cannot burst into flower and fruit at once without preparation. At first, also like the seed, I would advise that you "lie low" with no attempt to exploit your professionable capabilities, however high you may regard them at this time; but meanwhile quietly keep on striving for the higher future development of hoped for attainments. Then when you do send up your cotyledons (these two fat leaves that give you strength to send down a straight sturdy tap root) remember to put them forth quietly, and omit the brass band. All growth in nature is quiet growth, quite unheralded by self praise, and do not imagine that when you have attained the healthy well rounded growth of a fine sturdy professional planthood that the discriminating public will pass you by. On the contrary, people are everywhere alert for evidences of real excellence in young practitioners and the usual questions are: "What do you know of Dr. ———. Is he skilful?" "Can he be relied upon in every particular?" "Is he gentle, and does he keep himself and his instruments clean?" etc. But do not, I beg of you, under-estimate this period of "lying low" as a preparation for bursting into fruition.

There are always periods of unlovely and tedious preparation for every alluring profession, and it perhaps requires a man of vision to see the connection between the lowly humble beginnings and the heights beyond.

There have been many men, like Lincoln, who have arrived at the very zenith of human attainments in their special fields of occupation, and whose early lives were cast among the most humble and unpromising surroundings. And yet because they possessed that innate desire and determination to keep on delving for the acquirement of healthy useful knowledge of the fields into which they were thrown—perhaps with no great expectation of reaching these seemingly unattainable heights of the few—when the *call* came for *real* action it found them ready, and no doubt even surprised at their *own* equipment, which they had garnered and stored up in quiet, humble, persevering, endeavor.

I am reminded of a story our eminent consulting engineer,

Bion Arnold, loves to tell, of his own experience with a young aspirant for engineering honors. This youth was brought by his father to Mr. Arnold and the request was made that he be started at the foot of the ladder and that Mr. Arnold keep an eye on his progress. As the father was an old friend, Mr. Arnold introduced the young man in person to the blue-print room and left orders for the foreman to put him to work and report weekly as to his progress. After several weeks of unsatisfactory reports which mentioned general carelessness and lack of interest, Mr. Arnold sent him a warning and then hailed him on the carpet for a personal interview before dismissal. To his amazement, the young man, who had been listlessly attending to the recital of his shortcomings, became petulant and burst out with this remark, "Why, Mr. Arnold, I didn't come here to make *blue-prints*. I came here to be a *consulting engineer*."

So you might say with equal truth and with equal hopes of success, that "you did not come here to study tedious detail of the things that seem to you like drudgery, but that you came here to become skilful and famous practitioners."

Remember that you are *always* students, if you have the right grasp of your profession and a true conception of the possibilities which lie before you. You can learn something new and valuable every day of your lives that will apply to your practice. You can put this into something tangible and practical for your own good and the general good of your profession and mankind. If it is something original you can write about it, not for self-aggrandizement, but to teach others, for it is in that way that we progress as a profession. It is only by exerting ourselves to the fullest stretch that we grow to be bigger men.

As you toss the little store of your best endeavor into the literary pond of the profession, it may make to your ears and to those of others, but a feeble splash, but if it has the true ring of value, truth, and modesty, its circles may travel on and on, and no one can really say just where they end, or how great is the scope of their influence. "The smallest pebble in the well of truth has its peculiar meaning and will stand when man's best monuments have passed away."

I am not going to prolong this farewell faculty address by giving you a lot of advice upon professional and social ethics

of which I believe that the most of you are quite as capable of understanding the value of as I am. But I may say that you will find your greatest joys in the quiet walk of life with the simple pleasures. The gay white way has swallowed up many a moth and scorched many wings that were meant to fly, and a moth without wings is only a poor grub whose hours are numbered.

I know this class pretty well, as I could not help but know them by my method of recitation teaching. You perhaps hardly realize, also, how much we as teachers read in the many faces which surround us in the hours we spend together, even though not called upon for a recitation. For we are quick to catch expressions of intelligent understanding of the various questions and propositions presented, and more than that we are able to discern actuation of earnest endeavor to learn, and much of the real manly and womanly characters of those whom we may rarely otherwise see outside of the lecture room. And I want to say for the benefit of the relatives and friends of these young doctors of dental surgery that this is the best class, taken as a whole, of any class which it has ever been my pleasure to teach. Because it seems to contain a larger percentage of what we are pleased to call real gentlemen, with high moral and intellectual advantages, and with a seeming desire—so far as my department is concerned—to get right down to the very bottom of things. Of the young women of the class, it goes without saying that they have gained for themselves not only the highest respect of the faculty, but the respect of the entire class of students, over whom they have seemed to exert a high moral influence.

Therefore what is the need of my attempting to give you lengthy advice upon right living, etc., which most everyone is ready to hand you at this time without charge. As you know, "every little bit added to what you have makes just a little bit more," until you can easily have too much of even a good thing. But, after all, what have we now to give you, except a few suggestions from our own experience as we stand at the parting of the ways to wish you God speed. We think of *our* mistakes; of the mistakes we just avoided making; of the mistakes we have seen other men make; and the strong desire comes to us to try, even if futilely, to save you from the hard knocks and pitfalls of our own experience. The sky overhead is rosy with optimism,

but there are slippery places and pitfalls for the unwary. May your pathways avoid them. May you journey on the heights, where the way may be rough and full of ups and downs, but where the air is pure, and where the goal is always in sight.

Have you ever stood on the high bluffs of the great lakes, or the oceans, and while looking far out over the glistening waters, allowed your thoughts to dwell in imagination on the waves coming in, whose crests were decked with foam capped colors of the rainbow, and with song and murmur casting their treasures at your feet? and then realized that this picture truly represents the treasures of knowledge and skill brought on glistening waves from all past time, and freely placed at your feet by the hands and brains of those who have gone out, on to the deep waters of life and with patient, earnest, industry, and with no thought of self, have made you the inheritors of all this wonderful present day development in dentistry, which you have but to reach for and garner up for your own and for your future. May you truly reach these treasures of life, and the goal of real success which lies ahead of you all.

Gentlemen and Ladies of the graduating class, and your mothers, your sisters, and your sweethearts, who have listened so patiently to this farewell from the members of the faculty, I thank you, and we bid you farewell and God speed.



PROCEEDINGS OF SOCIETIES.

CHICAGO DENTAL SOCIETY.

HELD AT THE LA SALLE HOTEL, TUESDAY EVENING, APRIL 20, 1915.
8:00 P. M.

DR. THOMAS L. GRISAMORE, President, occupied the Chair.

Dr. Thomas B. Hartzell of Minneapolis read a paper entitled "Oral Prophylaxis in Its Relation to Pyorrhea and Its Treatment."

DISCUSSION.

DR. W. H. G. LOGAN:

I believe the large attendance here tonight can be accounted for by the reputation of the essayist and the interest the profession has in the correctness of the statement first made by Barrett and Smith and confirmed by Bass and Johns that the *Entameba Buccalis* is the etiological factor of pyorrhea alveolaris. Since, many of the dental and medical profession and laymen are convinced that the conclusions of these investigators are beyond scientific dispute and since the essayists could not for lack of time include in his paper any record of the previous work upon the ameba of the mouth, I believe it is most appropriate that we spend a few minutes in a review of these studies.

Gros in 1849 found an ameba beneath the gingiva upon the exposed gingival root surfaces and gave to it the name of *Amoeba gingivalis*. Steinberg in 1862 found a similar ameba in the same locality and termed it *Entamoeba buccalis*. Grassi in 1875 studied the ameba of the oral cavity and found one similar to those described and designated it *Amoeba dentalis*. Flexner in 1892 found a similar ameba in the secretions coming from an abscess in the inferior maxilla. In 1904 Prowazek described what is believed to be the same ameba under the name of *Entamoeba buccalis*. This same parasitic ameba was again found and described by Leyden and Lowenthal in a case of carcinoma of the mouth in a woman of sixty years and although they found them

abundant in the discharge they excluded them from having any etiological relation to the carcinoma.*

Braun and Luhe, of Prussia, in their 1910 edition of "A Handbook of Practical Parasitology" state that the *Entamoeba buccalis* is found in the deposits upon the teeth under the gums in the mouth of most human beings, but generally in small numbers only. They point out the necessity of distinguishing the leukocytes from the entameba. "That the living *Entamoeba buccalis*, moreover, when stained with neutral red, takes on a deeper color than the leukocyte. There is a marked differentiation between the hyaline ectoplasm and the nucleated endoplasm, the latter frequently containing numerous food boluses (fragments of leukocytes, bacteria, etc.)"

Craig, of the Medical Corps of the United States Army, in his "Parasitic Amoeba of Man" (1911 edition) makes the observation that the ameba described in 1862 by Steinberg is identical with the one studied by Prowazek and by him given the name *Entamoeba buccalis*; and to Prowazek should be given the credit of the first detailed description of this parasite and affirms that all ameba found in the mouth belong to this species.

Craig declares the geographical distribution of this ameba is world wide as he found it in the mouths of patients in the United States and Philippines, and believes that a careful examination will demonstrate its presence in almost every locality. He also makes the following significant statement. "We must regard *Entamoeba buccalis* as only a secondary invader of the tissues. The organism has not been cultivated artificially. It may be frequently demonstrated in materials scraped from the roots of perfectly normal teeth. There is no experimental evidence connecting *Entamoeba buccalis* with disease."

The most valuable recent work done upon the *Entamoeba buccalis* previous to Barrett & Smith was the report given before the American Dental Society of Europe in July 1914, "Researches Upon The *Entamoeba Buccalis*," by Dr. Angelo Chiavaro.† In part of his conclusions were as follows: "The *Entamoeba Buccalis* is found in the pus of all cases of pyorrhea alveolaris. It is

*"Researches upon the Entameba Buccalis," Dr. Angelo Chiavaro, DENTAL REVIEW, December, 1914.

†DENTAL REVIEW, December, 1914.

generally present in the materia alba of the sound teeth if they are not kept in a good hygienic condition. The *Entamoeba Bucalis* has not a pathogenic action, on the contrary, as it feeds on bacteria it is probably an aid to the autodisinfection of the mouth."

In the slide, now upon the screen we have a reproduction of two amebas from the exhibit of Dr. Angelo Chiavaro's collection published on page 1134 of the DENTAL REVIEW of December 1914, and, as he points out the larger entameba is in an advanced stage of encystment. In the protoplasm there are a great number of bacteria ingested by the ameba.

The smaller ameba shows the encystment process is less advanced but the presence of a great number of ingested bacteria is also seen.

Thus we find all of these investigators reach the conclusion that the ameba found in the oral cavity were not disease producing, and they were present in healthy as well as diseased mouths—that their most universal location was upon the crown and root surfaces beneath the free margin of the gums and although varied names were employed to designate the ameba, but a single species is present.

That these ameba ingest bacteria leukocytes and tissue fragments has been pointed out by Chiavaro and Craig.

This review brings us up to the latter part of the year 1914 when a declaration was made by Drs. Barrett and Smith and confirmed by Drs. Bass and Johns that the *entamoeba buccalis* was accountable for pyorrhea alveolaris. It is my opinion that these investigators have largely based their conclusions upon the relation of this ameba to pyorrhea from the results secured in the treatment of this disease by the employment of Emetin Hydrochlorid, locally by Barrett & Smith and hypodermically by Bass and Johns. For they report practically universal success in all cases so treated and further affirm that the suppuration subsides or is greatly reduced in a few days, without pyorrhea instrumentation, however, the recommendation is made that these deposits be removed.

I first employed Emetin Hydrochlorid as suggested in September 1914, continued the treatment for a brief period but did not feel that I was getting better results with it than had

previously been secured, therefore, I discontinued its use in a few weeks. However, in January of this year, I heard so many favorable reports, following the use of Emetin Hydrochlorid, my interest in the treatment was again aroused to the degree that I took up its use both locally and systematically. At the present time I am administering it to relatively one-half of my patients.

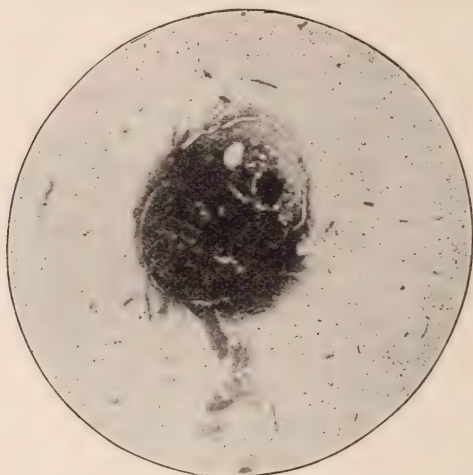
Because of the foregoing statements the question naturally arises as to why I am using Emetin Hydrochlorid in one-half of the cases of patients suffering from Pyorrhea. Allow me to explain that although I do not look upon this remedy as a cure for Pyorrhea, I am not satisfied there is not a beneficial therapeutic effect following the use of the remedy, so until I am convinced for or against it I will continue its use.

What are the indications that make me believe there is possibly such a therapeutic effect? I have seen some cases where no surgical or medical treatment had been administered, when the gums were pressed a great amount of hemorrhage resulted, the tissues were extensively congested and the teeth sore under pressure. Emetin was applied to the pocket or hypodermically in the arm and no local treatment given yet the congestion was relieved in some, but not all instances, the color of the gums became more normal and the soreness of the teeth disappeared. This change in the supporting structures can be accounted for through the hemostatic action of the remedy. These changes I have seen happen, but now let me affirm I have never seen the suppurative process even temporarily controlled by the sole use of the remedy.

In the discussion of a paper it is neither necessary nor essential for one to go over every point providing you agree with the essayist, but if there is some part that was partly covered that is the appropriate item to discuss. The essayist stated toward the end of his paper: "Assuming always the diagnosis has been properly made and the advisability for treatment of a given case determined," and then passed on to a consideration of bone treatment, without a consideration of how these important conclusions are to be arrived at. Therefore, I ask your attention to the consideration of the question, when is treatment indicated and contraindicated for a patient suffering from pyorrhea alveolaris?

During the present great wave for the easy treatment of

Pyorrhea by the use of Emetin Hydrochlorid, one of the unfortunate results has been that many men are leaving all the diseased teeth in the mouth and trying to save them with this new remedy, without regard to the exact clinical and systemic findings upon which we should base our decision as to whether we should extract or undertake treatment. As an example of how this can be accomplished allow me to present one case record in full of a patient who had previously received Emetin Hydrochlorid, administered hypodermically for two series of five treatments each in one-half grain doses. This was followed by the administration of thirty-six one-half grain Alcresta tablets in four days. On the

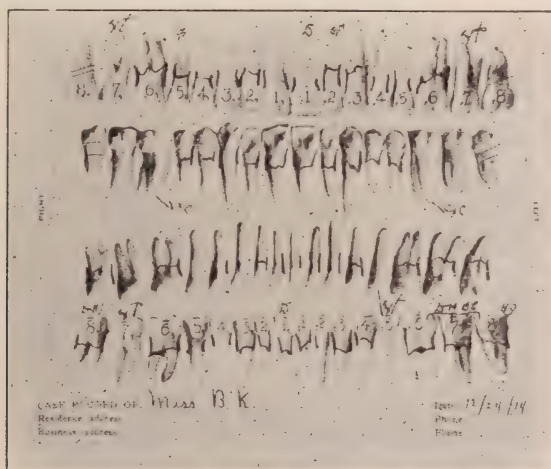


No. 1.

fifth day the endameba buccalis here shown was taken from one of the pyorrhea pockets. The enlargement of the endameba buccalis, shown in slide No. 1 was made by Dr. Gramm, one of the few men in Chicago who have had the proper training to do this work.

In slide No. 2, the markings upon the chart along side of the roots indicate, in this case, the location and depth of the pockets, the teeth considered fair, doubtful and those to be extracted are marked with the initials indicative of that condition. Slide No. 3 shows the back of this history sheet, here is recorded the blood analysis, urinalysis and blood pressure.

For the past six years I have kept record of all pyorrhea pockets as shown in slide No. 2 and for nearly two years the blood analysis and urinalysis as shown in slide No. 3 have been taken in all cases. As result of the evidence collected I believe the prognosis of teeth involved with pyorrhea, when no systemic contraindication is found, is good in single rooted teeth when the disease is confined to the gingival third, fair when the middle third is not extensively diseased, doubtful as it passes into the apical third and hopeless when the apical third is extensively involved and extraction should be demanded. In multiple rooted teeth under similar conditions, the prognosis is good when the



No. 2.

disease is confined to the gingival third and the bifurcation not exposed, fair when the bifurcation is exposed and the attachment between the roots is not destroyed, and doubtful to hopeless as the tissues in the bifurcation become extensively lost. All teeth that can be pronouncedly compressed in their sockets, in the absence of an acute inflammatory process, should be extracted. In many instances the extraction of a multiple rooted tooth can be prevented where the disease is only extensive about a single root by the excision of that root.

The essayist spoke at great length of the importance of leaving root surfaces in the pocket smooth and free from bacterial

DR. F. H. SKINNER:

Nothing succeeds like success, and the successful treatment of pyorrhea depends upon the thoroughness and delicacy with which instrumentation is done. The discussion of this paper is one of the most difficult propositions with which I have ever come in contact, because I am so thoroughly in harmony with everything the essayist has said. However, for the sake of discussion, I am going to pick all the flaws that I possibly can. The essayist says: "Pyorrhea alveolaris begins in the gum margins." This statement is absolutely true, but like any other form of local infection there must be a lessening of vital resistance in order to have the local infection take place.

The same bacteria can be found in both the mouth of a patient who is immune to pyorrhea and in that of one who has pyorrhea, with apparently all conditions the same so far as age, health and general care are concerned, and until we know why one is susceptible and the other immune, I do not believe we understand the fundamental conditions which make it possible for this disease to develop.

So far as the bacterial agents are concerned and the method in which the tissues are attacked, the work done by Dr. Hartzell and his assistant stands in a class absolutely by itself. If any one ever doubted the origin of pyorrhea, his doubts would be banished after reading the facts set forth in this paper, because the essayist has dealt strictly with facts and has given us no theoretical suppositions. He has taken the root surfaces and has found what was on them. Not only what the iodine or disclosing solution shows him, but of what that which is stained is fundamentally composed, by making cultures in Petri dishes, plating out and isolating the different forms of bacteria. Then he has beautifully depicted how the bacteria which are grown on the tooth surfaces are injected into the tissues. The one great lesson to be taken from this paper is to watch for and remove what, if left, eventually will cause trouble; or if slightly inflamed areas have already started, we should not paint them with iodine, emetin or some other germicidal agent, because even if we are able to reduce the inflammation it would be only temporarily, whereas if irritation is found, whether it be caused by bacterial growths, small particles of calculus or etched enamel

surfaces, the irritant should be removed, then nature herself quickly reduces the inflammation, and there is absolutely no more until some mechanical irritant warns of trouble again.

I am especially glad to hear the essayist speak so highly of the use of staining or disclosing solution. There are a number of formulae with which this can be done. The saturated solution of permanganate of potash and several different formulae for the iodine. Dr. Ferris uses a very weak solution of iodine. Nineteen grains of iodine to four ounces of water with just enough of the iodide of potassium to cut the iodine, and then follows this with a starchy solution, but to me one of its greatest values has been, to indicate to the patient the fact that a seemingly clean surface harbors a great variety of bacterial growths, and I want the disclosing solution to stain these masses black enough, so that the patient can see them readily with the aid of a hand mirror. To merely tell a patient that his teeth are not clean invites an unfriendly feeling toward the dentist who has the nerve to inform him of that fact, but to give him a hand mirror, after the disclosing solution has been applied and rinsed off with water, to let him see in black and white the amount of accumulation which is on his own teeth, usually sets him thinking, and the dentist does not have to stir up any unfriendly relations between himself and his patient. In fact, I believe it is one of the biggest practice builders of anything of which I know for those who wish to practice oral prophylaxis.

I am very much interested in the statements regarding all tooth roots being infected, because it shows that the bacteria which cause this trouble are present in all our mouths. The essayist has pointed out very clearly the manner in which the tissues are infected, also why the gingival margin is a favorable area for infection. I sincerely hope that the efforts of the research committee will, during the next few years, establish something definite as to why some mouths are immune to these infecting organisms and others are so susceptible. I wish the author would explain more in detail the ionic method of sterilization of apical abscesses, because it is as essential to blot out the cultures from the apices of abscessed teeth as it is to remove bacteria from the tooth surfaces.

I am extremely glad to hear the essayist come out so plainly

with reference to emetin in the treatment of pyorrhea. I have tried it out in every way, flooding the pockets, injecting hypodermically into the arm, and giving the alcresta ipecac by the mouth, and in but one instance have I been able to detect any seeming improvement from the emetin treatment. This was the case of a woman in a very run down condition. Her vitality was extremely low, and it was difficult for her to walk more than a block or two at a time. The leucocyte count was only 12,500, but she had a violent reaction from a one and a half million autogenous vaccine when given hypodermically. Instrumentation and vapor treatment would not bring the response of the tissues that I wanted, and as a last resort I tried the emetin hypodermically. I do not know as I should say that this patient's improvement was entirely due to the emetin treatment, because previous to starting this treatment, I had done thorough instrumentation on all of her teeth and had extracted seven teeth with blind abscesses. She also went to the Presbyterian Hospital and was taken care of by Dr. Billings, who was doing all he could to build her up physically. I also went over her teeth at least once a week in an endeavor to keep the tooth surfaces free from bacterial plaques. Within six weeks' time she gained something over 12 pounds, but whether the improvement was due to emetin, or due to the additional care she was having, in combination with the extraction of seven badly infected teeth, I do not know. Such favorable reports of the use of emetin in the treatment of pyorrhea were made, that I also wanted a share in these results, and was willing to give the drug credit for some of the improvement.

I want to emphasize the statement that the logical place to treat pyorrhea is on the tooth surfaces. This is something which cannot be driven home too often to the dental profession or their patients, because comparatively few dentists and fewer of the laity realize what the culture beds of bacteria on the surfaces of the human teeth mean to the human race.

The essayist speaks of a number of other forms of irritants beside bacteria, such as ill fitting bands, improper fillings, lack of contact points, malocclusion, etc. Emphasis should be put on the lack of contact points and malocclusion in this connection, because these two conditions probably are more responsible than

any other causes for the lessening of vital resistance of gum tissues in otherwise healthy mouths. How often do we see the enamel worn on the occlusal surfaces in the mouths of people at middle age. This results in the loss of contact and causes a lateral, or side movement, of one or more teeth every time the jaws are closed. A little grinding of these cusps at the proper time will preclude the probability of pyorrhea developing in these cases. Where it is impossible to restore contact or occlusion by grinding the cusps, it is perfectly legitimate to cut into an otherwise sound tooth and restore contact and occlusion, for just as sure as these two points are neglected, the teeth will eventually be lost, even though the patient is under a strict regime of oral prophylaxis.

The essayist lays considerable stress on doing all grinding and polishing of the tooth surfaces before starting to work under the free margin of the gums, and rather discourages the idea of doing any polishing there, for fear of the grit from the polishing substance becoming a permanent irritant. In this, I am in harmony and also generally agree with him in regard to sealing pockets according to the Adair method, but these things do not always bring results, because of the limitation of our instruments. In cases such as the bifurcation of roots, where our instruments are limited, I have been successful by following a technique for which I have sometimes been criticized, which is as follows:

After packing the soft tissues back with cotton or guaze, I polish the root surfaces clear to the end of the pocket with a wooden point carrying a very fine grit, followed with tin oxid. Suppuration usually ceases, so that from clinical evidence, I would rather have a smooth, highly polished tooth surface and a little grit remaining in the tissues than to trust to instrumentation alone in these cases. I do not mean that I universally polish out every case after instrumentation, but when I have trouble in stopping suppuration, I do not hesitate to pack the gum back and polish the root surfaces as thoroughly as I do the crown surfaces of the teeth.

I am very glad to hear the essayist say that he does not believe that the infection of the pericemental membrane is blood-borne, because we certainly have every indication that the in-

fection is carried directly from the tooth surfaces and the gingival margins. The use of compressed oxygen only verifies this opinion. I am also very glad to hear him speak so highly of Dr. Talbot's Interstitial Gingivitis, because it seems the most logical, clean, clear cut article that has ever been written on this subject, and not only does it seem so, but Dr. Talbot has proven what he says by actual photographs of the tissues which he has examined.

We cannot put too much emphasis on the necessity of planning just to the hard layer. This has been so beautifully brought out by the essayist that little more need to be said, but I do believe that a good many good men fall down in the treatment of pyorrhea from lack of proper instruments with which to do this delicate work. There are a great many forms of scrapers and gouges which have been sold to the profession from time to time as pyorrhea instruments, without which we would be a great deal better off. Instruments should limit the depth to which they cut and should be so delicately constructed that the operator knows practically what he is doing by the sense of touch and by the manipulation of the instruments. Unless a man has the proper instruments for this work and is gifted with a sense of touch so delicate that he realizes what he is doing, it would be better for him to let this class of dentistry entirely alone. This need discourage no man, because the dentist naturally develops an accurate sense of touch, and if he has the proper instruments and has been properly instructed as to how to handle them, he should have little or no trouble in handling pyorrhea cases. The one great thing is to know which teeth to save and which teeth to extract.

DR. J. P. BUCKLEY:

Mr. President: I am sure we all admire the interest and enthusiasm with which the essayist has handled his subject. The hour is so late that I hesitate to detain the audience, as we have other matters to attend to, this being our annual meeting; yet I would not like to see this Society go on record at this time against the use of emetin hydrochlorid in the treatment of pyorrhea. If we were to take the statements of the three gentlemen who discussed the paper without modification we would naturally conclude that the use of emetin hydrochlorid was practically

useless in the treatment of this disease. Doctor Logan claimed however, that some results seemed to be obtained with the remedy. No one was more skeptical at first than I, but my skepticism is gradually but surely fading away. I was misled by the statements of Barrett and expected to find in emetin hydrochlorid a *specific* remedy for pyorrhea. In my opinion it is not a specific, but that it is efficacious it seems to me no one can doubt who has used it and watched results.

Knowing that we are to have this paper on this subject, and knowing too, that Doctors Bass and Johns had reported such wonderful results from the use of emetin hydrochlorid hypodermically, and from alcresta ipecac by way of the mouth, I took occasion a few days ago to write Doctors C. S. Tuller and C. Edmund Kells, both of New Orleans. My letter stated that here in Chicago we were hearing some startling reports regarding entamebas as the cause of pyorrhea and emetin hydrochlorid as a specific remedy, coming from New Orleans. This is due largely, if not entirely, to the published writings of Doctors Bass and Johns. I take it that you must have had as much experience in using emetin as any other dentist in your locality, and I would like your detailed answer, with permission to use the same, to the following questions:

1. Are you satisfied that the entameba buccalis is the cause of pyorrhea?
2. Have you been using emetin hydrochlorid hypodermically? If so, what are the results observed?
3. Have you used Alcresta Ipecac? If so, what are the results so far compared with the hypodermic use of emetin?

Dr. Tuller's reply follows:

"Now to take up your questions in order. No. 1. No. I am satisfied that *the entameba is only a factor* in the disease. Only a lack of pathological knowledge could lead one to accept the entameba as *the* cause. Bass himself pulled the props out from under that position when in his article in the J. A. M. A. for February 13, 1915, No. 7, he says on page 554 'It is not at all probable that entameba can attack healthy tissue. *Damaged* tissue is necessary, very likely, and it is highly probable that the injury should furnish a kind of pocket or closed ulcer.' Now if we could prevent the degeneration of the tissues involved, we would not be

interested in entamebas any more than in the pathogenic bacteria that also inhabit the pocket.

2. "Based on the above I have hesitated to inflict hypodermic treatment on my patients until some more definite evidence of benefit of a permanent character was forthcoming, so I have never used any emetin hypodermically. Some of my patients have received the treatment at the hands of Dr. Bass and I can report improvement, but no instance of cure.

3. "Yes, I have used alcresta ipecac, in conjunction with fl. ext. ipecac, 1m. to six teaspoonfuls of water as a mouth wash, employing it experimentally on some cases without any instrumentation whatever, to determine the *uncomplicated* result. Following the course of medication, I scale to complete the job. Results prior to instrumentation are really noticeable. A marked decrease in the inflammatory condition in about six days' time in some cases, and little change in others, but no amount of treatment for any length of time will conquer all the inflammation in the presence of mechanical irritants. These must be removed. Patients all report less bleeding of the gums in brushing. It does not stop a flow of pus. Will calculi stay removed? Not in my opinion. Will re-infection take place? Most assuredly. Is this a cure? No, *not until you can confer immunity will a cure be accomplished*. Some of the men I know curing (?) Riggs' Disease with ipecac have been curing (?) it for years with each new remedy suggested and seem to have been equally successful in each instance and are always ready to grab a new treatment, so their testimony is not greatly valued by me.

"Personally I believe ipecac and its alkaloids will be another *aid* to our routine treatment, especially in incipient cases (gingivitis) and of little value in chronic cases with deep, large suppurating pockets where the bone is involved. A good deal depends on what you call a cure. Amebic Dysentery can be cured for *six months* with emetin, but seldom for longer periods."

Dr. Kells' reply is as follows:

"Replying to your questions, would say:

1. "No one could convince me that in a few short months it could be *conclusively proven* that pyorrhea is caused by entameba alone, but I am open to conviction with time.

2. "I have used the alcresta in a very few cases, and so far

believe that for several reasons, the hypodermatic method is the better."

I thought the opinions of these men from New Orleans would be of interest at this time. Dr. Tuller has expressed my views exactly. I simply want to say this, that before twelve months pass by, in my opinion, the man who is not using emetin in some form, and I believe the alcresta is the better form to use because you can get the same effect by mouth administration as you can hypodermically—I believe the man who is not using the alkaloids in some form in the treatment of pyorrhea in twelve months will not be doing all he can do with the drugs.

I agree with Dr. Logan and Dr. Tuller that emetin will not control pus formation. Emetin is an amebacide, not a bactericide; and it is bacteria which produces pus. If we curette the pocket and use other means to kill the bacteria, we certainly can reduce the inflammation, the teeth feel more comfortable, they seem to tighten and the pockets seem to heal more readily when emetin has been used. This is my experience to date.

DR. C. E. BENTLEY:

Mr. President: I am sure I voice the sentiment of every one here when I say that this meeting is an epoch in the history of the Chicago Dental Society, and this paper is going to be an epoch in the literature of dentistry, for it involves some very revolutionary statements.

All of us have been tremendously interested of late in the claims of the advocates of emetin and the entameba buccalis as being the cause and cure of pyorrhea. The contrary statement made by the essayist to the effect that the streptococcus viridans is probably the host in this particular disease adds zest to the occasion. The fight that is to come in after months is going to be the entameba buccalis vs. the streptococcus viridans; because while the essayist did say specifically that he did not claim it to be the cause, yet he left us to believe that that was the particular existing cause because they were found in large numbers, whereas the entameba was found in about one-fourth of the cases from his investigations of over 2,000 cases.

When a man with the acknowledged equipment of Dr. Hartzell and his reputation as an investigator speaks on this subject

we hang upon his words, because they should be words of wisdom. I, however, do claim that if the streptococcus viridans is the cause, as inferred by the paper, that neither the essayist or Drs. Barnett and Smith have proven it according to Koch's law. What is the inexorable law laid down by Koch? There are three inexorable rules, namely, the specific organism must be associated with the disease, second, it must be isolated apart from the disease; third, when introduced into healthy animals it must produce the disease, and in an animal in which the disease has been experimentally produced the organism must be found under original conditions. I submit that neither the essayist nor the gentlemen who say the entameba buccalis is responsible for this disease have complied with the three requisites that Koch has laid down, and which all bacteriologists have followed.

I want to say another thing with reference to a positive statement made by the essayist that pyorrhea starts at *all* times from the gingival margin. While he has produced almost incontrovertible evidence, he has not yet proven it. The preponderance of evidence is in his favor, but according to the inexorable laws of science, it has yet to be proven.

The most beneficial thing to me in the paper is the splendid technic that this gentleman has offered with reference to the treatment of this disease. I do not know of anything that is quite so valuable as the statement he made with reference to the planing of the roots. A number of years ago Dr. Hartzell referred to that indescribable sensation referred to in his paper, when the fingers touched the glossy surface of the root. As between over-scraping and under-scraping, I will take my chances on the latter, for the reason that the exposition of these lacunae invite constant reinfection. I have some cases where under curettment the pus had ceased and eight or ten months thereafter there has been a recurrence of the pus and I could not stop it. I am quite sure that I over-scraped and exposed the lacunae. I am not an enthusiast over emetin. I am too old in dentistry to be swept off my feet by every tidal wave that comes along, but with the tremendous flood of testimony from all sides, I, like Dr. Logan, have tried it thoroughly. In fact my patients made me try it, and my testimony corresponds with most of you, that so far as the pus is concerned it amounts to *nothing*, and I have

used half a pint of it. In the reduction of the tumefaction of the gums, tightening of the teeth, the result has been satisfactory. I am using it conservatively, not radically.

In conclusion I want to say that I believe we are on the threshold of a great awakening. I believe we are about to solve that terrible enigma that has been the bane of the dental profession for years. I believe it is such pioneers as our essayist who will lead us into the promised land, and I believe it is for us to give him every support and encouragement so that we will be in at the finish.

DR. TRUMAN W. BROPHY:

Mr. President: We are dealing with a question of pathology. The essence of this whole question is inflammation. What causes inflammation? Inflammation must precede supuration. In the condition under consideration, it is due to irritation. The condition may be aggravated by some systemic disturbance, low vitality, by some underlying disease, and the local manifestations that we find are due to some local irritant. To cure the inflammation the local irritant must be removed. Now how long has this condition existed in the human family? We do not know, but in this box I have evidence of its existence many years. I am going to take up a very few moments of your time and show you the contents of this box. It has been of interest to scientific men for these six years, or since its discovery. It is a model of a mandible of a man discovered in the sands of Germany, and it is stated by scientists that this man lived something like 50,000 years ago. He had what you call "pyorrhea" or pus flowing. He had destruction of the alveolar process. I will read a short letter that will explain what I mean. I received the letter from Dr. Bödecker of Berlin:

"Enclosed you will find the promised translation of the article pertaining to the *Homo Heidelbergensis*. I am sorry to say that no exact age is mentioned in this article and I therefore wrote to Heidelberg to find out about this point, but have not as yet heard anything. By this time you will have received the plaster cast of this fossil, and I hope it will make an interesting acquisition to your collection.

"As to the age of this human mandible, it is considered to be

at least 50,000 years old, if not older. A geologist can gauge this age through the description of the position of the find. I remain,

Yours very sincerely,

C. F. Bödecker."

This specimen shows that dento-alveolitis has existed, in all probability, as long as man has inhabited the earth. It is to the credit of the dental profession that this movement, original research work, was placed on foot by the National Dental Association and that laboratories have been established to assist in carrying on the kind of work that Dr. Hartzell has been doing for the last few years.

I have nothing more to say except to express my appreciation of the address by Dr. Hartzell and the excellent discussion that has followed.

DR. THOMAS L. GILMER:

Mr. President: I wish to congratulate Dr. Hartzell on his excellent paper.

The ameba is an organism which has always interested me. Thirty odd years ago I took up the study of fresh water alga under the guidance of Dr. G. V. Black. This study was undertaken as a basis for the study of bacteriology and pathology. In this study I came across the ameba, and when Barrett and Smith announced their findings of the ameba in pyorrhea pockets, and Bass and Johns verified their findings, my old interest in the ameba was revived, and I commenced a series of experiments, both as to the ameba in pyorrhea pockets, and to the use of emetin hydrochlorid hypodermically in the treatment of pyorrhea. I was skeptical about the ameba being an etiological factor and also that emetin was a specific; but since Barrett and Smith and Bass and Johns were men of reputation, I felt that their theories were worthy of consideration, and that it was unfair not to give the subject due consideration.

In my first series I examined the pus from twenty well developed pyorrhea cases. In eighteen of these the ameba was present. In one of the cases in which the ameba was not found the patient had just finished a course of potassium iodid and mercury, and to this I attributed the absence of the organism. In the other I was unable to account for the absence of the protozoa.

In these eighteen cases I injected hypodermically emetin hydrochlorid, one half a grain daily for four days in succession, with no other treatment of any kind.

In a few days after the last injection, microscopic examination was made and sixteen of these cases gave negative results. In two the ameba were still present. In some of these cases there was improvement, in others marked improvement.

I then made another series of examination in *non*-pyorrhea cases. There were twelve in this series, seven of which showed ameba, and five were negative. In four of the negative cases the gums were perfectly healthy and the mouth and teeth clean. One had taken alcresta ipecac a few days before. In the non-pyorrhea cases in which ameba were found the gums were red at their margins, but there were no well defined pus pockets.

In four to five weeks after the use of the emetin treatment, in the pyorrhea cases microscopical examinations were again instituted. I then found the ameba just as numerous as before, and what gain there had been in the mouth condition had been lost.

The essayist said that the ameba is not an etiological factor in causing pyorrhea. I hardly think we can, at this time, make this positive statement. That the organism is so universally present in the mouth does not necessarily mean that if it is an etiological factor we should find pyorrhea in all mouths. The pneumococcus is always present in the mouth, still all do not have pneumonia. The fusiform bacillus is almost universally present in the mouth, still Vincent's angina which is caused by it, is comparatively rare. Symbiosis between the ameba and some other organism may be necessary to cause pyorrhea.

The essayist has said that emetin does not lessen the pus flow. This does not coincide with my observations. If the inflammation subsides under the emetin treatment we would naturally expect a lessened flow of pus. My observation leads me to believe that if one depends wholly upon emetin or any form of ipecac as a cure for pyorrhea, he will be greatly disappointed.

If I understood Dr. Hartzell correctly he said that he does not believe that apical infections of roots of teeth are of hemogenous origin, that such infection comes either through the pulp canal or through the peridental tissues. He arrives at this conclusion because the hemolytic streptococcus is found in the

tonsils and the veridans in chronic root abscesses. In Moody's and my study of the bacteriology we found the hemolytic streptococcus in the acute abscesses and the veridans streptococcus in the chronic form. Rosenow has found that the hemolytic streptococcus is changed into the veridans type by varying the oxygen tension. Following the acute form of abscess we have the chronic form. The suppurating area is then deprived of a full blood supply by the connective tissue wall which is built around the end of the root. This lessening of the blood content, lowers the oxygen tension, and the organisms being partially deprived of oxygen, is it not reasonable to suppose that they are changed into the veridans type as a result?

DR. J. E. NYMAN:

Mr. President, it has been held that there is no pathogenic action in the entameba because of the fact that they exert a certain kind of phagocytosis. They may do that. Every organism feeds on something. It may be in the use of emetin hydrochlorid we are using an antitoxin because we are using a vegetable proteid, and all of the antitoxins have some form of a proteid, whether vegetable or animal. The ameba may eliminate a toxin as a definite factor in the cause and continuance of pyorrhea. I simply suggest that you inject not only the pocket but the tissues around it, first being careful to sterilize the surface with iodin, and having it thoroughly dry. I have five cases and I am compelled to believe that there has been remarkable curative effects in the treatments I have given.

DR. HARTZELL (closing the discussion):

Mr. President, I did not make the claim that the streptococcus is a specific factor. I have only offered a certain amount of evidence. I hope you will weigh it for yourselves. I do not believe in dogmatic statements and I believe the acid test of time must be used to bring out the truth or falsehood of the statements made here this evening.

In regard to the question of Dr. Logan relative to bacteria gaining entrance below the gum margins, I think he is right. The mouth is the dirtiest cavity of the body, bacterially speaking.

In regard to the advisability of treating these cases by taking the blood pressure and blood count and using all the means at our disposal to determine the physical condition of our patients,

it is absolutely correct. No better method could be suggested. I was delighted with the work Dr. Logan was engaged in today and would say that we in Minnesota are trying to follow the same idea. In our college work we take the blood pressure into account in all our cases. We analyze the urine and record our results. We find it of very great benefit in determining what line to follow with our cases. During the past winter I found five cases of diabetes, one now on hand in which the sugar was 3 per cent before the treatment was commenced. Since that time the sugar has been reduced to nil.

There are just two slides that I would like to have thrown on the screen. Those two cases were not treated by emetin and they speak for themselves. (Illustrating on screen.)

I feel very much like the rest of you gentlemen in regard to the use of emetin. Let us not stop its use until we know beyond doubt that it is of no value. Perhaps there is something we have overlooked that will enable us to secure the benefit from it that is claimed for it by its friends.

ILLINOIS STATE DENTAL SOCIETY, FIFTY-FIRST
ANNUAL MEETING HELD AT PEORIA,
MAY 10-14, 1915.

DISCUSSION ON THE PAPER OF DR. CAHILL, ON "MATERIA MEDICA
AND THERAPEUTICS."

DR. P. G. PUTERBAUGH, Chicago:

It is a pleasure to attend the meetings of this society, and to be called upon to open the discussion on such an excellent and interesting paper as that to which we have just listened.

It seems to me that the strongest points Dr. Cahill has made are these: to know the remedy you are going to use, and then apply it intelligently, in a manner that will do the greatest good. If a man runs an automobile, or a dental engine, or employs any instrument or appliance, it is necessary for him to understand its internal mechanism, and become familiar with the construction of that mechanical appliance in order to use it intelligently, and I believe the same thing is true of the man who is

applying drugs or a combination of drugs. I know that one can apply a remedy composed of several ingredients intelligently if he understands the individual ingredients and the way in which they are combined. We use certain preparations in the treatment of pulps of teeth and pulpless teeth; these should be compounded by ourselves occasionally. There is no reason why any intelligent dentist cannot do it once or twice, in order to learn how they go together. If you use a certain compound containing thymol, or eucalyptus, or whatever it may be, when you come to apply it, you will do so more intelligently than you could possibly do by having it put up for you under a proprietary label with a fancy name.

I would warn you against the purchase and employing of the many formaldehyd root fillers now on the market. Perhaps the most pernicious practice that can be charged against dentistry today is that of filling ordinary root canals with the many preparations that are recommended for this purpose in the advertising pages of dental journals.

I have done some work with the X-ray and these are the cases that come to us to be radiographed because of pain of indefinite origin. We X-ray all of the teeth on the affected side and almost invariably find evidence of trouble in teeth with these patent root-filling preparations for which you are paying exorbitant prices. Dentists have deceived themselves in thinking that these preparations would be permanent. So in connection with this paper I would emphasize the fact that we must know the ingredients in the preparations which we employ; and then, we must apply remedies in such a manner that they will be retained in the teeth. Personally, I think I can seal them in best with cement. If one uses gutta percha and manipulates it properly it may be all right; but do the root canal technique thoroughly, and when you use remedies apply them in such a manner that they will be retained in the tooth and they will do the work for which they are intended.

DR. C. W. KENT, Stretator:

I have enjoyed the paper very much. I do not believe we can succeed through a haphazard use of drugs, and those men who have made a special study of this phase of the work have given us the best that there is.

I was glad to hear Dr. Cahill mention particularly the work done by the pharmacologists and bacteriologists in this special line and to recommend us to use certain preparations, provided we understand the ingredients and know what we are using.

A man came into my office a few days ago who has been practicing dentistry in our state for some twelve or fifteen years and asked me what success I was having with tricresol and formalin. I told him what I had been doing. He said he had discontinued it entirely and I asked him why. He said there was continually soreness from the use of these agents as mentioned in the paper. I asked him about his technic and he described it to me in this way: He cleaned out the canal as well as he could, then saturated a pledget of cotton upon a broach and worked it well up into the canal. Usually he took a small pledget of cotton in his pliers, saturated it, applied it to the pulp chamber and put in a temporary filling on top of it. Gentlemen, I do not believe that is the proper way to do. I think we should use a smaller quantity of the medicine itself, and then apply it and a dry pledget of cotton on top of it before using cement to seal in the treatment.

As to the use of counter irritants which Dr. Cahill mentioned, I do not know what he had reference to when he said that counter irritants should not be given to patients to apply at home. I have used the formula recommended by Dr. Buckley, of chloroform, menthol and aconite with very good success, particularly where neuralgic conditions were present. I think there are many cases where the application in the office does its part and has its place, but it seems to me that a patient can well apply this remedy over the part affected to very good advantage.

DR. JOHN P. BUCKLEY, Chicago:

I think every teacher in a dental college has a right to be proud when his students go out into the world and make good, and I would feel that I would be ungrateful to my associate teachers in the college, Dr. Cahill, and the two young men who have discussed this paper if I did not at least arise to offer my commendation of their efforts.

In the dental profession today we are reaping the harvest of our own folly. We have placed ourselves in a position to be criticized by the medical profession, and since the X-ray is reveal-

ing so much, and since the statement of Dr. Gilmer is undoubtedly true, that a large percentage of devitalized teeth have associated with them abscesses without sinuses when the individuals little suspect the presence of such conditions, we can clearly realize it. We should realize too that many have been filling root canals, not after the method of Dr. Noyes, not according to the method described by Dr. Gethro in Chicago not long since, but after the methods described by manufacturers of root canal filling materials who use the catch words "permanently antiseptic." They lead you to believe that their preparation used as a root canal filling, containing formaldehyd as it does, will take care of the pulps that you fail to remove. They say it is permanently antiseptic and used as a filling you can fill the root canal in a sloppy way if you want to—half fill it without making any effort to get the root canal filled to the end, and go home and sleep. Many have believed these statements, have used such methods; and now we are justly reaping the harvest of our own folly by such a practice.

This paper I hope will teach men to think. Medical men are not thinking any more than we are. Without digging down under the surface, they think they can cure pyorrhea alveolaris by injecting a remedy into the circulation of the patient without removing the local irritants that are causing the trouble and keeping it up. It is a mistake. It cannot be done.

DR. C. M. CAHILL, Chicago:

In conclusion, I would like to emphasize the remarks made by Dr. Black this morning, with regard to individual study. I have presented to you a few drugs with a hope that you may understand them in such a way as to create an interest in the drugs or remedies you are using, and that you will devote a little more time to studying individual drugs. Three things may preclude the possibility of success in any case where treatment is required: Improper diagnosis, improper use of drug (i. e., drug not indicated) or use of proper drug or drugs but not up to standard. If you know your Pathology (have a proper diagnosis), and know your Materia Medica then no one will be able to impose inferior drugs upon you to cause you trouble. Dr. Puterbaugh's remarks are timely. "When you really like drugs, you will become more familiar with them." You must do some

compounding yourselves. It is educational. It may teach you that the gentle art of "compounding" is not so easy as may be imagined. I imagine that I can fill a prescription, compound drugs with some degree of accuracy. Nevertheless I find, and I think you will find also, that some of the manufacturing chemists improve on our very best efforts.

Any drug, remedy or agent used topically—locally—to influence favorably a deep-seated lesion is a counter irritant. With the exception of Lugol's (Liquor Iodi Compositus) Solution, the tissues to be counter irritated should be dried before application of the agent is made. It is to be applied to an initial point. The more or less indiscriminate smearing over of an unlimited area is needless and its continuation on part of patient causes sloughing of tissue and a mouth unnecessarily sore.

I want to thank the gentlemen who came down here to discuss my paper.

ODONTOLOGICAL SOCIETY OF CHICAGO.

A regular meeting was held May 4, 1915, with the President, Dr. A. E. Royce, in the chair.

Dr. Truman W. Brophy read a paper entitled "Cysts."

DISCUSSION

DR. J. H. WOOLLEY:

The paper that has been presented by Dr. Brophy is so different from a great many papers I have heard and subjects that I have read. It is clearer and seemingly very simple, yet it must have required great thought to put it in the form in which he has. I recall a writer on philosophy whose style was so simple and clear that it was like reading a novel. Dr. Brophy's paper is so clear and so well written that it has greatly interested me. There was no padding in it. Personally, I want to thank him for his valuable and interesting contribution.

DR. P. J. KESTER:

There was one point that occurred to me in the beginning of Dr. Brophy's paper with reference to classification about which I would like to ask him a question. It was under the head of retention cysts. Speaking of the ordinary blister which

is produced by rowing, etc., I would like to ask him if these things do not form between the layers of the skin rather than in the connective tissue? These so-called blisters are simply infiltrations between the layers of the skin rather than below the true skin. While this may not be of great importance, it is a matter of information. I may be wrong. If it should be true, then that is the only criticism or correction I can think of.

In speaking of membranes surrounding these cysts, I have not thought on this subject at all, and I am not speaking with any authority, nor am I posing as an expert in this line. However, I do not think there is a true membrane formed. We speak of an abscess being surrounded by a membrane, but I do not think, as a rule, abscesses are surrounded by a membrane. They are surrounded by a wall of cells to confine the inflammation or disturbance at one point. It is a misnomer to speak of it as a membrane.

I think Dr. Brophy compliments this society when he reads us such a valuable paper as this. We should feel greatly indebted to him for the masterly work he has done in this particular line. When Dr. Brophy has finished his book and has published it, he will have a work that will be a standard throughout the world on this particular subject.

DR. C. N. JOHNSON:

I want to express my appreciation to Dr. Brophy for bringing this paper before us at this time, and also to state, as the other gentlemen have intimated, that it is the clearest and most masterly presentation of the subject of cysts that we have had before any of our dental societies. It gives us a basis upon which to work and to diagnose these conditions. I believe that when this paper shall have been published, it will do a great deal of good.

Dr. Brophy has told us that it was largely along the line that he had treated the subject in his book, and I want to say in this connection that when this book comes out, it will be a masterpiece on oral surgery for the dental profession. We are all impatient to see the book finished.

I can only mention the case that we had exhibited to us tonight. It was my good fortune to see that little boy the day before he was to be operated on, and I believe it was two weeks

ago today. The change in him was to me a great revelation. When I saw him he was absolutely deformed, with the most repulsive looking growth. I would not have diagnosed the condition as a simple cyst. I believe Dr. Brophy has intimated that it was not only a cyst, but a cyst complicated with a neoplasm, and that neoplasm was a serious growth to my mind. This growth had extended so that it had distorted the boy's face; the lower jaw in that region was protruding; the growth had extended so far upward from the lower jaw that there were indentations all through it made by the upper teeth in the attempt on part of the boy to masticate. How he was able to masticate at all I do not understand. Not only that, there was a peculiar color through the growth. It was a sort of purplish, as if something caused distention, and the mucous membrane was strained and stretched over the growth. I can imagine that when Dr. Brophy first put the knife in there it was attended by profuse bleeding. It looked as if the tissues were engorged, and it was not an operation I myself would have invited. As I have said, the change in that boy, as exhibited tonight, is remarkable indeed. He is running around, is chipper and bright, and the deformity has disappeared. I hardly knew the boy when he came in tonight, although I examined him two weeks ago yesterday.

It seems to me, not only the Odontological Society of Chicago but the profession at large are under the deepest obligations to Dr. Brophy for the work he is doing in this line. He is doing a more diversified work than any of us, even those who are intimate with him, can realize. Each new development shows the wide diversity of the service he is giving to humanity. I feel impressed by this more and more as I watch the progress of his work. I wish it were my privilege to see more of his practical work in surgery. I do not think any man knows what he is doing except himself, because no man can follow him, day after day.

This Society is indebted to him for bringing us this and other papers and thus broadening out our field of effort as a society.

DR. L. L. DAVIS:

I cannot say anything that has not already been said in regard to this valuable and instructive contribution which Dr. Brophy has brought before us this evening.

So far as a discussion of the subject itself is concerned, it is entirely out of my field and beyond me. I can only compliment the essayist on the great and valuable work he is doing, and to say that it is an honor to have the pleasure of listening to such a paper from a man like Dr. Brophy.

DR. WINTHROP GIRLING:

Dr. Brophy's paper is especially interesting to me because of an experience that has happened to me within two or three years. I have been practicing dentistry nearly twenty years, and to my knowledge a cyst has never come to my notice until within two or three years. A lady presented herself with a condition of the superior maxilla surrounding a lateral. Her story was that she had been to certain dentists and had been treated for an alveolar abscess, and was told that the tooth would not bother her, but that if anything appeared at the apex she was to prick it with a needle. She had done so for a little over a year, and it was no better, and in the household there were some of my friends who were patients of mine who urged her to come and see me and find out what the trouble was. There was a little exudate of serum seeping out of the opening in the region of apex of the lateral, so I had a radiograph taken and it showed a dark part surrounding the lateral and the apex of the central. I called up Dr. Brophy, but found he was out of the city, so I took the radiograph to Dr. Gilmer, and he said there was a cyst there and it should be removed. I asked him if he would not remove it, and he told me what to do. I extracted the lateral and curetted the area, took off the apex of the central, and packed it as Dr. Brophy has suggested. Some two or three weeks later I had another radiograph taken and it showed this area had considerably diminished in size. I then crowned one tooth and swung in a dummy. This was two years ago. I have not seen the lady since then, but I shall try to communicate with her and see if the thing is all right. The lateral, which was extracted, showed the root bored through the side and the root filling protruded through the opening thus made, and probably because of that a cyst occurred.

Only recently I had a young man with an upper central that had been abundantly filled. The apex of the tooth was quite a bit denuded. This tooth was filled some years ago when

he was a lad, and the cyst was attached to the central. I extracted that, and kept the wound open. This was done in the winter, and I do not know how he is getting along.

In listening to Dr. Brophy's paper it was of interest to me because my practical personal experience with this line of work had only come to me after so many years of practice, and which was all the more interesting because of that experience.

I am sure, that in this paper, when it shall have been published, we shall see the clearness with which these different cysts and formations have been described; and yet I always feel when I am up against such a proposition as this that I am ill prepared to take part in such a discussion. However, in the particular case I have related, Dr. Gilmer told me how to proceed to treat it, and in following his advice I accomplished my object.

DR. J. G. REID:

I do not know much about oral surgery. I have listened to many papers from the facile pen of the writer of this paper, papers which have been read before this and other societies, and I must confess that when he got through it was very hard for me to follow him closely. But in the paper he has presented tonight he has shown marked ability to sift it down to the real thing and he is telling us now exactly how easy it is to do it and how readily it can be done.

He reminded me very much of the late lamented Jonathan Taft, who used to lecture to us. Dr. Taft had a wonderful flow of language, and one could sit for an hour or more and be entertained by him with a nice speech. And just about all there was in that lecture one could have told in three minutes. So in this case we have got a wonderful lot of material sifted down to the point that a child can understand it; that a child with any reasonable education can take that paper and almost diagnose the condition from the reading of it. It is wonderful how simple the description of these cysts and their appearance have been.

We are in no position in our practice to see many of these cases, but one does come up occasionally, and when it does we ought to be sufficiently posted to determine what the condition is. I have only had two such cases of cysts.

One of these cysts was in a lady's mouth, who was about twenty-eight years old. I saw her when I was in the Champlain

Building. I sent the case to Dr. Brophy for operation. He told me about this cyst. It was about as large as a hen's egg. It had one of the glistening fibrous walls surrounding it, and it was in connection with the first or second bicuspid. The condition was brought about by an abscess. It had progressed for about a year and a half before it came under my observation, and I made a diagnosis of cyst. I did not care to operate, and so I sent the case to Dr. Brophy. He operated on it and removed the cyst.

The other case I had last spring occurred in a young lady, twenty-four years of age, with lower first molar. An abscess appeared something like eighteen months prior to the time I saw her. It had been treated by two or three different dentists in this city, as well as by a dentist in Des Moines, Iowa. She came here as a stenographer, and this abscess had been troubling her for some time. When she came I found quite a swelling of the jaw. This was in the mandible, the lower first molar, and the contents of the discharge came through the canals of the molar and it had been treated as a blind abscess. When I discovered the character of this fluid, which attracted my attention particularly, I said to myself that is hardly an abscess, because the fluid contents does not show it to be such. I concluded with my own knowledge or what little I had that it was the beginning of a cyst. So I determined the best thing to do was to remove the tooth, which I did, and after I had removed the tooth I found a pocket in the wall of the mandible, with quite considerable absorption of the external and internal wall. There was a pocket as large as a quail's egg. I was not able to determine that there was a membrane about that cyst. From what I had seen in the hands of two or three operators in those cases, I made up my mind that there was evidently a membrane there, and that I had been instructed in these clinics that this membrane must be removed in its entirety as suggested by the essayist. So I curetted the walls of that cavity very thoroughly all around, and it was about two months before I discharged the patient, when it healed up beautifully.

Those are the only two cases of cysts within the history of my practice. We do not see many of these cysts, and when we do see them it is well to have this interesting and valuable paper

presented to us and to govern us in the treatment of such conditions.

I want to compliment the essayist on the simplicity of the description of these various tumors or cysts and the ease with which one is enabled to diagnose them from the description given.

DR. J. H. WOOLEY:

I studied very carefully one case and acted upon the advice that was given to me by Dr. Cook. This was a case of an abscess. There was a swelling that indicated possibly a cyst; there was just a slight opening of the gum. I attended to that till I could see the interior and discovered necrosis. There was a discharge of blood and pus, and I used a remedy that Dr. Cook suggested, namely, sulpho-phenic acid. I made a dressing of that, moistened a piece of cotton, placed it in the pocket and covered it with gauze, and every day when I took the cotton out the little pledget of cotton showed granules of bone that were thrown out. The action of the sulpho-phenic acid was limited, but it seemed to destroy the dead bone. After a while the case was cured. It took me quite a little while to do it. There were sinuses under the bicuspid and molars. I believe there were four sinuses which ran under the teeth in the bone. The bone necrosed, and after a while healing took place.

Some of my professional friends criticized me and said I should have curetted and saved the alveolar process. Had I curetted, I believe I would have injured the teeth.

I would like to ask Dr. Brophy in reference to these cysts whether it is possible to incise or lance them and place a medicine something like sulpho-phenic acid to destroy the disorganized masses inside and thus prevent any repetition of the diseased condition? It might take a longer time, but is it possible in such a case to accomplish as good results by curetting?

I am not criticizing the operation of Dr. Brophy, but it seemed in this particular case the medicine acted upon the dead bone and the diseased tissues and in that way a beneficial result was produced.

DR. BROPHY (Closing):

I wish to thank you for receiving my paper with approval and with such kind expressions.

With reference to what has been said regarding the simplicity of the description, I want to say to those who have appreciated the simplicity and clearness with which I have dealt with this subject, that I have endeavored all my life to make things clear and simple and put them in such language as to be easily understood, although I have not always succeeded. There has been a good deal of effort made to avoid the use of expressions which are ambiguous or of double meaning, which may be construed to mean what I did not intend. From the beginning of what I have written in my book, I have done my best to avoid all of these complications. While my book has not yet appeared, my highest wish is that it will not be a great disappointment to my professional friends.

Regarding the subject that has been presented this evening, while I realize that to a busy practitioner of dentistry such conditions do not often appear, and while I have never discussed to any great extent the clinical work I have been engaged in the last fifteen or twenty-five years, I may say that all the time clinical work is increasing, so I feel that I am just getting well into it now.

I sometimes marvel at the great variety of diseases that come into the clinics. I do not think it is any exaggeration to say that from eighteen to twenty-five are in my clinic every Tuesday, with every conceivable disease of the mouth and the parts associated therewith. If I were not to become interested in my work and to feel that it is necessary to acquire all the information available upon it, and do it the best I know how, I would not be worthy of the position I occupy. I often feel overwhelmed with the tremendous volume of this kind of work that I have to do.

Permit me to digress for a moment to say that when the statistics appear in my book on the subject of harelip and cleft palate alone (there will be about 800 illustrations), 125 of which will be on harelip and about 165 on cleft palate. This will give you some idea of the large number of patients I have operated on. Some men will say, I presume those figures are exaggerated, but the facts are there.

Today in my clinic there were four patients with harelip or cleft palate. My registrar said we have forty-five clinics in a year, and if we take twenty-five clinics with two patients in a

clinic, and consider the number of cases we have in one year, and then multiply that by the number of years, I have been operating, you will have some conception of the number of these cases I have operated. The multiplicity of these cases I really marvel at when I review the statistics from various hospitals. I bring this up to show that a great number of people all over the country come here to be taken care of. But let me come more closely to the subject of the evening.

Dr. Kester spoke of fluids beneath the skin in connection with these little cysts that form. The fluid I think would be found to go between the skin and the fascia, and that is not a true cyst. That is to say, it has not a cystic wall, but only the accumulation of serous fluid that lies between the skin and the fascia. When it is drained off or absorbed, no morbid condition will result.

Again, as to the membrane that surrounds the cyst. It must be borne in mind that an abscess, which is often the starting point of a cyst, is necessarily surrounded by fibrous membrane because the membrane is the expanded pericementum. An abscess forms within it and expands it. As the pus increases the membrane expands. This membrane was often spoken of by Dr. M. S. Dean and by Dr. Cushing and Dr. Judd as the pyogenic membrane because it was a membrane in which there was pus. The pus continued to secrete, and they spoke of it as a pyogenic membrane or pus developing membrane.

DR. KESTER :

That is not so considered now.

DR. BROPHY :

No. What I wish to bring out and to make as clear as I know how is that a cyst should not be classed among tumors. Under the old classification of tumors a tumor expressed an enlargement. Under that classification, any contusion which resulted in a swelling of a part was considered a tumor. If one should get a blow in the face or on the arm or a dilation of the tissues by reason of the passage of serous fluid into the connective tissue, strictly speaking, under the old classification that would be a tumor, but now in the light of modern nomenclature, and the result of careful study and investigation, in an effort to

classify these conditions as they should be, a tumor necessarily must be a neoplasm, a new growth.

The late William H. Van Buren, of New York City, gave a definition for tumors which, if you remember, would make it impossible for one to call anything else a tumor than a neoplasm. He said, "A tumor is a local limited enlargement taking place in any part of the body and consisting in its substance of an outgrowth of new tissue which has no physiological purpose in its growth." It is a new growth. It is a local enlargement and it is limited. It could not be so-called dropsy. Dropsy is a term that implies a condition. It is the sequel of a disease, but not a disease per se. It follows nephritis or disease of the heart, etc. The accumulation of fluid then, no matter how large it may be, cannot be a tumor, although it is under the old classification an enlargement. A tumor is a neoplasm or a new growth; yet probably enlargements from any cause for the next hundred years will be called tumors. A cyst may be associated with a tumor, or with a neoplasm. In the case exhibited there was no other course to pursue than to remove the teeth. Sometimes, however, when a cyst forms a tooth may have sufficient attachment in its alveolus to remain useful after the cyst is removed.

I have not spoken of cysts generally. There are multilocular and dermoid cysts, and many other kinds of cysts I could not call attention to in this short paper.

To return to the remarks made by Dr. Reid, he referred to my plain language and clear description. I have tried to do that, and I want to thank him for his remarks.

Many of these conditions known as odontomes when fluids gather about them, are really centers for the formation and development of dentigerous cysts.

There is one special feature about the treatment of these conditions that I regard as important. When this one thing is omitted everything else fails, and that is to get a large, wide orifice so as to secure good drainage and see the cyst fill with granulations. A cyst in a bone is not unlike empyema of the antrum. The most rational course is to maintain a large opening and to see it get well. We have patients in the clinics, many of them, with great plugs of gutta percha in cysts, for the purpose of maintaining an opening until they fill with granulations. The

plug should be as large as the finger and should be shaved off from time to time until granulations fill the cavity. Stimulation of the surfaces from time to time by scarification will promote healing. Iodin is one of the most potent germicides ever discovered. When we get infection, we may use everything, all of the different agents known and they may not suppress suppuration, but if iodine is used it will destroy the pathogenic microorganisms.

This brings to my mind an experience. When I was on the staff of the First Regiment in the surgical department, I assisted Dr. Senn in examining some candidates for positions in the various regiments—young surgeons. He put the question to one of them like this, "What remedies would you employ for arresting suppuration in the tissues to destroy pathogenic microorganisms?" One young man, who was examined at the Presbyterian Hospital, said he would use bichlorid of mercury, nitrate of silver solution, and milder solutions such as glycothymolin, boracic acid solutions, etc. Dr. Senn said, "Can you not think of anything else?" He mentioned one or two more, and Senn said, "What do you think of iodine?" The young man replied, "Oh, well, yes, I might add that too." (Laughter.) Senn then said: "Young man, remember when all other agents fail, pin your faith to iodine, iodine, iodine."

Coming from a man of his knowledge and his wonderful experience, it made a profound impression upon me and I have never forgotten it.

Dr. Woolley asked the question, would some other means be serviceable in destroying the cyst wall. We remove the wall of the cyst, the membrane surrounding it. We may use caustics, but why use them when you can take the wall away. If you use caustics you may have to repeat them time and again. Some portion of the membrane may not be destroyed by the action of the caustics, and you might destroy some tissue you would not want to destroy. If you can get into the sac and get hold of the membrane, it is generally possible to pull it out just as you peel a banana and have it over with. I prefer in all these cases to remove the walls.

DR. CARPENTER:

I would like to ask Dr. Brophy whether one could use un-

vulcanized rubber, or would that be prohibited on account of the mercury?

DR. BROPHY:

I would use either gutta percha plugs or make plugs of hard rubber. The reason why I use a gutta percha plug is that it is handier to shave down. If I use hard rubber I have to file it. If it is made of gutta percha and made smooth, it serves the purpose very well.



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EDITORIAL.

THE EASTMAN BENEFACTION.

As announced in the August number of the DENTAL REVIEW, Mr. George Eastman of Rochester, N. Y., has endowed a dental dispensary in Rochester following the lead set by the Forsyth Brothers of Boston in their magnificent endowment in that city. After a visit to the Forsyth institution and a conference with a committee from the Rochester Dental Society, Mr. Eastman made the proposition to the society that he would build and equip a dental dispensary at a cost of from \$250,000 to \$300,000, this conditioned upon the willingness of the city to furnish at least \$20,000 a year for five years, an amount sufficient to carry on the prophylactic work in the schools; that private citizens contribute \$10,000 a year for five years, and Mr. Eastman himself would contribute \$30,000 a year for five years. At the end of that time Mr. Eastman will furnish an endowment of \$750,000 if these conditions have been met and the work is being carried on satisfactorily. He will then have paid into this enterprise over one million dollars.

This splendid benefaction places Mr. Eastman in the same class as the Forsyth Brothers. Although his endowment is not so large in the aggregate as theirs, yet it is calculated to answer the purpose for Rochester as adequately as theirs has for Boston. It is the spirit behind these philanthropies and the practical good they ensure which is the most gratifying feature of the donations. There is also the stimulus given the movement in favor of oral health,

and the example set for the wealthy men of other cities to inaugurate similar benefactions. There is the encouragement given to the dental profession in the realization that public spirited men of means are recognizing the significance of the care of the teeth as a factor in individual and community welfare; and above and beyond all else is the real definite and tangible benefit which is to accrue to the coming generations—not only the one that is being cared for now by these endowments but the generations of the future whose material welfare, and we verily believe whose moral welfare will be inestimably enhanced by the work that is being inaugurated today.

Such men as the Messrs. Forsyth, Mr. Eastman and Mr. Julius Rosenwald of Chicago are building better than they know. Mr. Rosenwald's dental philanthropy was less in degree than the other gentlemen though perhaps no less in importance, coming when it did. It will be remembered that back in 1912 and 1913 when the movement for the care of the teeth of poor children in the public schools of Chicago was being carried on through the precarious medium of voluntary service, and when the few infirmaries in operation—three or four in all—were crowded beyond their capacity, with a pathetic waiting list of children seeking service—it was at this critical stage that Mr. Rosenwald volunteered to equip more infirmaries, making ten in all, and to pay the salaries of ten operators till such time as the city could be induced to take over the work. This he did till January, 1914, when the city assumed the obligation, and has been conducting the infirmaries since.

All honor to men of the type of Forsyth, Eastman and Rosenwald. They have gone out into a virgin field with their philanthropy, and have inaugurated a work which will make future generations rise up and call them blessed.

BOOK REVIEWS.

PRACTICAL ORAL HYGIENE, PROPHYLAXIS AND PYORRHEA ALVEOLARIS. By Robin Adair, B. S., M. D., D. D. S., Professor of Oral Prophylaxis and Pyorrhea Alveolaris, Southern Dental College, Atlanta, Ga. 1911-1913; Oral Surgeon, Grady Hospital (1910-1912); Oral Surgeon to Georgia Baptist Hospital, etc., etc. Second edition, enlarged and revised. 462 pages.

Price \$5.00. Published by Oral Hygiene Publishing Co., Atlanta, Ga., 1915.

This book is a very great improvement over the first edition. The author has relieved it of many of the unfortunate typographical errors of the previous volume, and it is therefore more pleasant reading. As to the practical value of the work, the best evidence is the ready sale and the fact that the second edition is called for so soon. The points of view of many men are given, and the significant things they have said on the various subjects are carefully recorded. No practitioner therefore who essays to do this work—and who in modern practice does not?—can afford to be without the book. The author has put much earnest effort into the work and deserves well of the profession. We bespeak an extended sale.

TEXT BOOK OF OPERATIVE DENTISTRY. Third edition, by C. N. Johnson, M. A., L. D. S., D. D. S., Professor of Operative Dentistry, Chicago College of Dental Surgery.

The third edition of this most comprehensive presentation of the subject of operative dentistry revised and enlarged and published by P. Blakiston's Son & Co., Philadelphia, has just appeared. A careful perusal of any portion of this book will prove that its great popularity is justly merited. The constant and painstaking effort of its popular author to keep this work thoroughly up-to-date is everywhere apparent.

A new chapter on the Application of the Roentgen Ray to Dentistry very clearly and concisely presents this subject in a form that is readily grasped by student or practitioner and very properly emphasizes its importance in arriving at a correct diagnosis of many problems presented in daily practice.

G. N. W.

PRACTICAL HINTS.

Edited by J. E. Schaefer, D. D. S.

(This department is for busy readers. We want short articles containing practical hints—the shorter the better. No article must exceed 200 words, unless of exceptional merit. Every dentist has some useful hint that has been of value to him, and if he will only put it in print it may be of equal value to others. That is what this department is for. Due credit will be given for every article sent. Address J. E. Schaefer, 1745 W. Harrison St., Chicago, Ill.)

Bridge Attachments:—Sufficient attachment can be had by means of interdental bands, partial crown, or hood attachments with or without dowels or inlays. In this class of cases it is desirable to preserve as much as possible the natural crown of the pier teeth; but if necessary to sacrifice the crown of an anterior tooth an interdental band form of attachment will serve well.—*M. L. Schmitz, D. D. S., Chicago, Ill.*

Detachable Porcelain Crowns:—These crowns, I believe, should always be made with an intervening metal base between crown and root, and may be made banded or bandless, according to the requirements of the case. If made bandless, a base of either platinum or pure gold of 36-gauge should first be swaged and bur-nished to perfect adaptation to the root and the dowel fitted and attached to the base with 20 or 22k solder, then the porcelain crown ground to fit at the labial, leaving space toward the lingual, which is filled with inlay wax and cast, it being often necessary and advisable to include in the casting the post portion which extends up into the porcelain.—*R. E. MacBoyle, D. D. S., Chicago, Ill.*

Fixed Bridges vs. Removable Bridges:—“As to hygienic conditions by comparison, as between fixed and removable bridges or partial plate, if you please, if the abutting teeth have been well prepared, all things being equal, there seems to be no difference in my mind.” That the ordinary fixed bridge, carelessly planned and constructed, is open to criticism from the hygienic standpoint, is conceded. It is the writer’s opinion, however, that selected cases, properly constructed, can be made to conform to hygienic demand, provided they are given the necessary attention by the patient.

Every person wearing a fixed bridge is entitled to know the importance of maintaining its hygienic integrity, for the purpose of prolonging its length of service and, incidentally, their own good health.—*W. C. Hulick, D. D. S., Cincinnati, Ohio.*

Porcelain Crowns:—In many cases it is difficult to make a good porcelain crown for a molar tooth, but they can be made and made to fit for any of the teeth in the mouth. One of the advantages of the porcelain jacket crown is that one of the laws laid down by every speaker, I believe, may be disregarded and that is you should never set any kind, sort or description of shell crown over a live pulp. Do not misunderstand me. No *metal* shell crown *should* be set over a live pulp in any case I can think of other than that mentioned in the papers. The reason a porcelain shell crown differs in this respect from a metal shell crown is that the former is a non-conductor of heat as is the natural enamel removed and consequently with the natural lost enamel, replaced by a good non-conducting porcelain jacket crown, the pulp of the tooth is just as well protected as in the first place, provided the joint at the gingiva is perfectly good. I know of several men who have put on many of these crowns and have had very few inflamed pulps on that account.—*L. H. Arnold, D. D. S., Chicago, Ill.*

Ringer Solution:—This Ringer solution should be prepared freshly for use each day and kept as a stock solution for the compounding of the anesthetic.

Freshly distilled water should always be used in making up the Ringer stock solution, and each operator should have a still incorporated in his instrumentarium. Upon investigation we find the Silverman Jena glass still to be the most convenient and economical upon the market.

The Ringer stock solution should be kept in a Jena glass container called the Ringer Flask.

An injection syringe designed by Dr. Guido Fischer is ideal for this work, and when not in use should be kept suspended by a German silver, nickel or gold plated stand in a Jena glass jar containing a solution of alcohol 75% glycerine or 95% alcohol.

Upon removing the syringe from the alcohol-glycerine bath, the

syringe with needle attached should be thoroughly washed out by drawing boiling distilled water from an evaporating dish into the syringe and expressing it three or four times to remove all traces of the alcohol-glycerine solution. The distilled water used for rinsing the syringe should not be returned to the evaporating dish on account of traces of alcohol which are in the syringe.

After the syringe has been washed out as indicated above, the anesthetic solution which is prepared by bringing to the boiling point one "E" tablet per c.c. of Ringer stock solution, may be drawn into the syringe.

Iridio platinum hypodermic needles should be used, and before drawing the solution into the syringe the needle should be heated to a cherry red for further sterilization, and all air expelled from the barrel of the syringe.—*F. R. Henshaw, D. D. S., Indianapolis, Ind.*

"The Endamoeba Buccalis in Pyorrhea Alveolaris:"—The drug preparations used are (1) hypodermic tablets emetine hydrochloride $\frac{1}{2}$ gr., (2) 1 c.c. ampules containing a solution of $\frac{1}{2}$ gr. emetine hydrochloride in water, (3) 2 c.c. ampules of $\frac{1}{2}\%$ solution emetine hydrochloride, (4) Alcresta Ipecac tablets.

The hypodermic tablets may be administered hypodermically in the arm—dose one tablet per day. Or a $\frac{1}{2}\%$ solution for local use may be made by dissolving one tablet in 100 minims of water.

The 1 c.c. ampule containing $\frac{1}{2}$ gr. emetine hydrochloride is intended for hypodermic administration—dose one ampule per day.

The 2 c.c. ampule of a $\frac{1}{2}\%$ solution of emetine hydrochloride in water is prepared for local use in pyorrhea pockets.

The Alcresta Ipecac tablets may be given by mouth, without causing nausea—dose 10 gr. tablets, two tablets one half hour before meals.

Treatment, whether local or general, or both, may be carried on three days continuously, followed by two days' rest, then resumed for three days again.

The danger from hypodermic administration is soreness at the point of administration.

The dangers from the use of the $\frac{1}{2}\%$ solution in the mouth are: (1) Nausea from swallowing some of the solution, and (2) stomatitis, of a characteristic nature. Discontinuance of the use

of the drug and an oily, antiseptic spray for the mouth will cure the stomatitis promptly.

The danger from the use of Alcresta Ipecac tablets is that diarrhea may be produced. This is much more likely to occur in men than women. Treat simply by reducing the dose or discontinuing the use of the drug according to the severity of the diarrhea. —Howard R. Raper, D. D. S., Indianapolis, Ind.

CORRESPONDENCE.

THE STATE BOARD SCANDALS AND THE REMEDY.

To the Editor of the DENTAL REVIEW:

Once again within only a few months since the Dr. Diamond affair a shadow has been cast upon the honesty and integrity of our state board, proving for the second time that neither a governor nor his political advisers are qualified to pass upon the fitness of the men who are to serve as dental examiners.

I believe no one will deny that as a result of the recent exposures given such wide publicity through the press we have suffered a great deal in the esteem of the general public. Particularly, however, has our standing been impaired in the eyes of the profession outside of Illinois, and thereby shattering any hopes that we may have had for reciprocity with other states.

But all of this is of small importance compared with the fact that if the charges and rumors of corruption are true, then a lot of ignorant and incompetent men are allowed to enter the dental profession to the detriment of the health and welfare of the people, both because these men are lacking in knowledge and skill and because any man dishonest enough to obtain his right to practice by corruption will not hesitate to be dishonest in his financial and professional dealings with his patients.

Now the question is, what are we, the dentists of Illinois, going to do about it? What are we going to do in order to prevent dental boards appointed for political influence rather than for integrity and ability from nullifying and destroying the intent and purpose of our dental laws and from besmirching the good name of the dental profession?

The answer suggests itself. Take the board out of politics.

and put its appointment upon a rational basis. The profession collectively is the only competent judge in this case. Therefore let the profession through the state society designate a few men who are worthy to be members of the board, and the governor should make his selection from them. There is a clause in the recently passed Pennsylvania law which reads as follows:

"The Pennsylvania State Dental Society shall have power to nominate from its membership at least double the number of candidates required to fill the vacancies occurring annually in the office of Dental Examiner. Said candidates shall have been engaged in the actual practice of dentistry in this commonwealth during a period of not less than ten years. The Governor of this commonwealth shall have power to appoint dental examiners to fill all vacancies, occurring from any cause, only from the candidates nominated as aforesaid. No member of the faculty of a dental college shall be eligible to appointment as a member of the State Board of Dental Examiners. In the event of failure of the Pennsylvania State Dental Society to nominate candidates, as aforesaid, the Governor shall appoint members in good standing of the said society, without other restrictions. The Governor shall have power to remove any examiner for continued neglect of duty, incompetency, or dishonorable conduct."

It is up to our legislative committee to get busy and have a similar clause inserted in the dental laws of this state. In the meantime the ad-interim committee of the Illinois State Dental Society should circulate a petition among the dentists of the state requesting the Governor to follow in the footsteps of some of his predecessors whose appointees were men recommended by the profession, so that the Illinois State Board of Dental Examiners may again be known far and wide for its high mental and moral caliber as it was in the days of men like Pritchett and Pruyn and others of similar type.

In conclusion I want to add that unless we wake up and do something to prevent the recurrence of these scandals a time will come when each one of us will have the burden of proving to our patients that we are competent and that our license does stand for ability to do and not for ability to pay.

M. D. K. BREMNER.

MEMORANDA.

ANNOUNCEMENT.

The twenty-eighth annual meeting of The Northern Illinois Dental Society will be held the third Wednesday and Thursday of October in Freeport. All dentists in Northern Illinois who have not been fortunate enough to have attended the Panama-Pacific Dental Congress may find consolation in attending our meeting. Cross the days in your appointment books. Do it now.

F. H. BOWERS, Secretary.

MICHIGAN STATE BOARD OF DENTAL EXAMINERS.

The next regular meeting of the Michigan State Board of Dental Examiners, for the examination of applicants who wish to practice dentistry in Michigan, will be held at the dental college at Ann Arbor, beginning Monday, November 1st, 1915, at 8:00 A. M., and continue through Saturday, November 6th. For application blanks and full information apply to A. W. Haidle, Secretary, Negaunee, Mich.

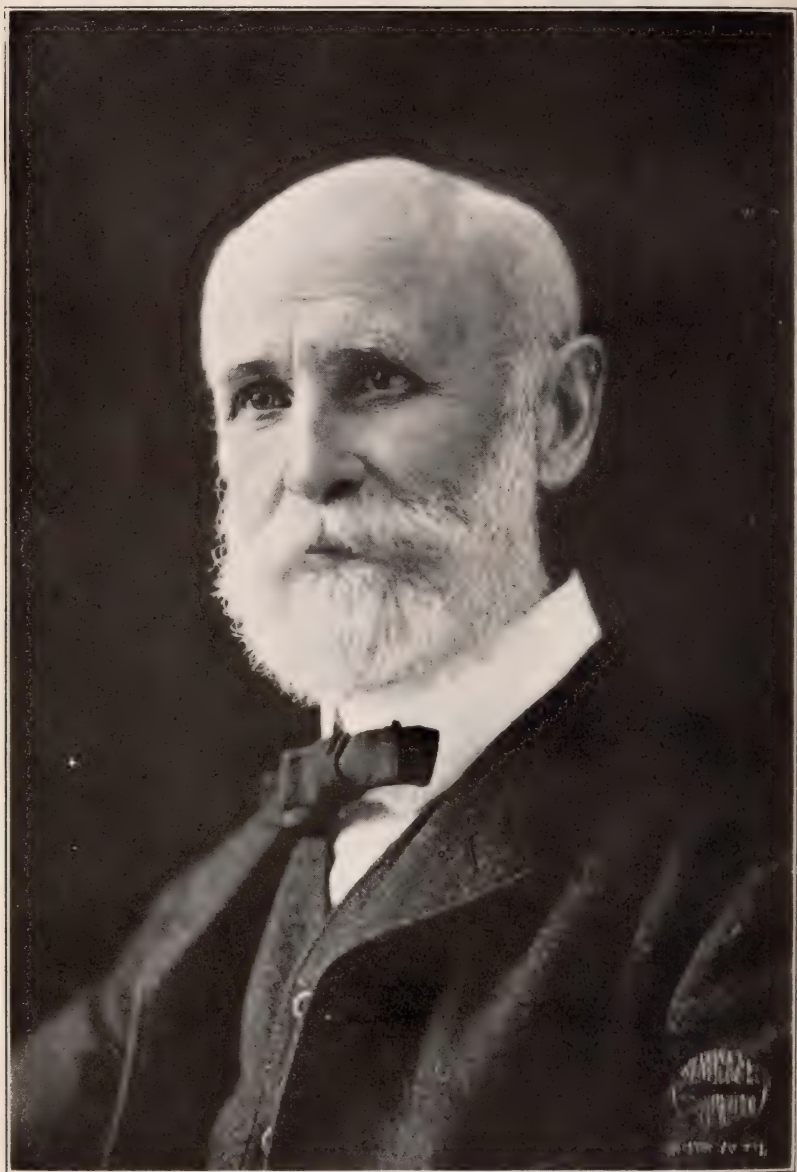
XI PSI PHI FRATERNITY.

Greetings from the Alumni Chapter of the State of California and Alumni Chapter of Southern California. During the Panama-Pacific Dental Congress, August 30th to September 9th, a Xi Psi Phi Fraternity booth will be maintained on the floor of the Congress to assist in every way the needs of our visiting members. Kindly register at the booth upon your arrival so that we all may become acquainted and be of service to one another. Wednesday, September 1st, will be "Fraternity Day." By order of State of California Chapter. H. Edward Gedbe, President; Edward J. Howard, Secretary and Treasurer.

COLLEGE COMMENCEMENTS.

DENTAL DEPARTMENT, UNIVERSITY OF MARYLAND.

W. R. Bird, M. Brumberger, C. A. Buist, D. C. Danforth, J. A. Davila, J. W. Farr, A. H. Herbert, H. Honick, E. J. Lariviere, J. W. Lewis, A. S. Loewenson, H. J. Loomis, E. A. Lynaugh, H. M. McLean, H. McIntyre, L. E. McKeown, W. S. Mitchell, H. D. Newton, C. J. O'Connell, H. W. Paul, C. R. P. Gomez, J. J. Pursell, Jr., F. Q. Magana, R. Y. Rankin, V. H. Roca y Carbonell, E. D. Roof-Scimeca, W. N. Scrubbs, J. R. Secrest, L. V. G. Simons, F. H. Smith, S. S. Sobell, J. R. Thompson, H. E. Waterman, J. R. Walker, B. H. Webster, J. J. Wolk.



G. W. Black, M.D., D.D.S., Sc.D., LL.D.

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No. 10

A GENERAL CONSIDERATION OF REMOVABLE PARTIAL DENTURES AND THE VARIOUS FORMS OF ATTACHMENTS—HAVING IN MIND THE CONSERVATION OF THE REMAINING NATURAL TEETH.*

BY DR. C. W. COLTRIN, CHICAGO.

It is the opinion of observing men in the profession that "improperly constructed and injudiciously placed partial dentures have been the cause of the loss of as many, if not more, teeth than any other operation we are called upon to do." However true this may have been in the past, surely it should not be so now.

We have traveled far and fast the last few years in the field of prosthetic construction. We have astonished the world with our ingenuity of invention and proficiency in craftsmanship. That which once seemed impossible has, with modern methods and appliances, not only become possible but comparatively easy of accomplishment. If, then, it still be true that we are constructing partial dentures that are causing widespread destruction, it is because we fail to profit by the experience of the past and do not make intelligent use of the more effective and efficient methods our brains and skill have developed.

While perhaps the problem of perfect retention in all classes of cases has not yet been solved, we can, with the various forms of attachments and clasps now at our command, retain in position in the mouth with a large degree of comfort to the patient, and a minimum amount of harm, almost any form of partial denture it may be desirable to construct.

The mere retention of a denture, however, is not the only matter

*Read before the Illinois State Dental Society, May, 1915.

for us to consider. In the light of present-day knowledge of the dire results that may follow irritations, or injuries, to the tissues of

1.



FIG. 1.

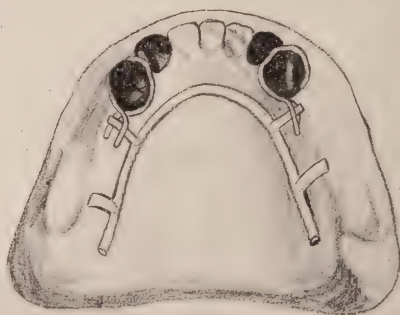


FIG. 2.

the mouth, caused by improperly constructed dental appliances, we must, if we wish to keep the confidence of the public and maintain the high standing of our profession, so construct our work that it

will *not* cause injury and destruction, but tend to bring about conditions of health and comfort.

I believe there is still a large place in dental practice for the partial denture. Fixed bridge work, when clearly indicated and properly constructed, is perhaps the best means that we have of supplying missing teeth; but when placed upon diseased roots, or loose teeth, it is not only a failure so far as usefulness and comfort is concerned, but is also a menace to the health and general well being of the patient. In many cases, where fixed bridge work is now being placed, it would undoubtedly be far better to extract the diseased and useless teeth it is attached to, and resort to the more sanitary and healthful partial denture.

No department of dentistry calls for more skill and judgment on the part of the operator than that of partial denture and removable bridge work construction. In fact, it has become a skilled specialty. To do this class of work as it should be done the operator must have, besides a high order of mechanical ability, an intimate knowledge of and practical experience with the many methods and appliances available for use in these constructions, together with a real interest in the work and a disposition to give to it the careful thought and attention its importance demands; otherwise, he will fall far short of success.

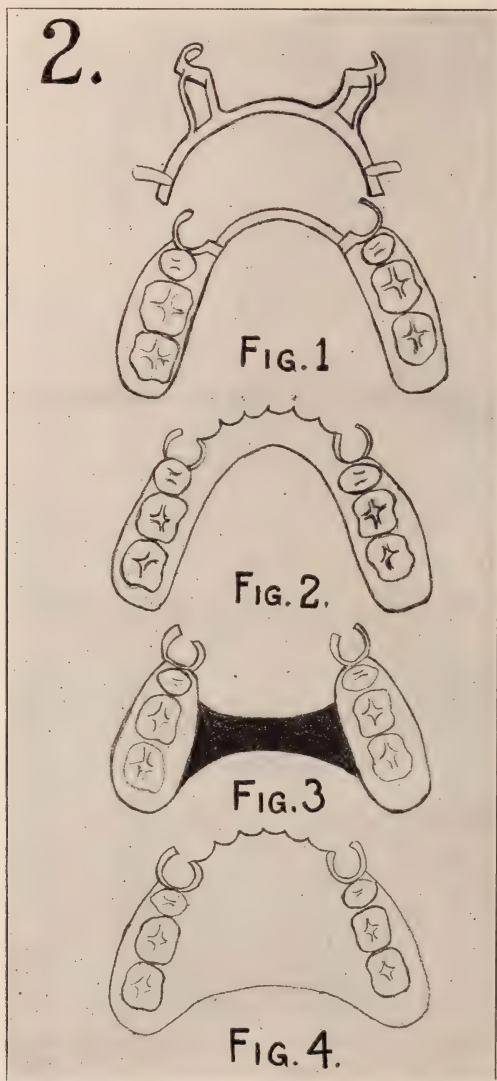
In considering this subject from a constructive point of view, it is so vast that one can but touch on the most important factors, which are the impression, the model, plate outline and manner of retention. Occlusion is also an important factor, but the subject is too extensive to be treated comprehensively in a paper of this description.

THE IMPRESSION.

Of all the causes incident to failure in the construction and adaptation of partial dentures, imperfect or inadequate impressions head the list.

That there is urgent need of an awakening on the part of the profession to the necessity of better impression taking one has only to visit the dental laboratories to become convinced of this fact. It is not an uncommon occurrence for them to receive impressions that are little better than misshapen clods of plaster or distorted gobs of wax, from which they are expected to construct satisfactory den-

tures. In justice, then, to the laboratories, who are in reality acting as our assistants, to say nothing of our patients, who have a right to



expect the best of service, we must see to it that our impressions are all that they should be.

Because of its utmost importance, this first step in the line of constructive procedure should claim our most careful thought and attention; for, to make a successful partial denture we must have an impression that is in most respects an exact negative of the parts to which we wish to adapt or attach the denture and such adjacent parts as are necessary to aid in its construction. (The exception pertains to the soft tissue, certain areas of which it may be desirable to slightly distort by compression.)

Before proceeding to take the impression it will be well to form a more or less definite plan as to plate outline and manner of retention, as this will aid in determining the extent of surface to be copied and in many cases simplify the procedure by avoiding undercuts and leaning teeth in parts not necessary to the work in hand.

Of the several materials now in use for taking impressions (all of which have their own particular merits), I believe, all things considered, plaster of paris to be the best for general use in partial denture work. There are cases, however, where modeling compound should be used, and, when properly manipulated, a more suitable impression can be taken with it than with plaster of paris.

To obtain adequate results in the use of plaster of paris it must be properly mixed. In view of this fact and that it is just here where many fail to get good sharp impressions, I am going to quote from Prof. Geo. H. Wilson's *Manual of Dental Prosthetics* the following technique for this procedure:

"One fluidounce of water, of the temperature of the room or a little warmer, is placed in a rubber bowl and four or five grains of salt (NaCl) dissolved in it, a measure holding two fluidounces should be filled with regular dental plaster (French's), but not packed; this plaster should be shaken or sifted into the salted water and gently agitated with the plaster spatula until it is smoothly mixed. The object is to get the plaster smoothly mixed and free from confined air." (Larger quantities would, of course, be mixed in the same proportion.)

The technique of impression taking for partial denture construction is also too large a subject to attempt to consider here in its entirety. I will, however, briefly describe the methods most commonly used in taking such impressions with modeling compound and with plaster of paris.

THE MODELING COMPOUND IMPRESSION.

The following method of taking modeling compound impres-

3.

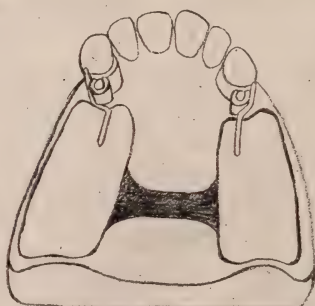


FIG. 1.

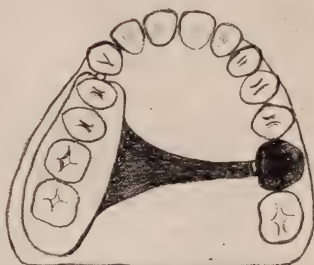


FIG. 2



FIG. 3.

sions may be employed in cases where there are no marked undercuts or complications which will prevent removal without too much distortion.

Select a suitable tray and adjust flanges so that the compound will be firmly compressed about the teeth and upon the soft parts. Soften the compound in warm water until it becomes semiplastic and after placing in warmed tray, work with the fingers into approximately the shape required to fit over the parts which are to be copied. Then pass the compound through a blue flame until its surface is quite soft, temper in warm water to prevent burning the tissues, carry into mouth and press to place. Chill with cold water and remove.

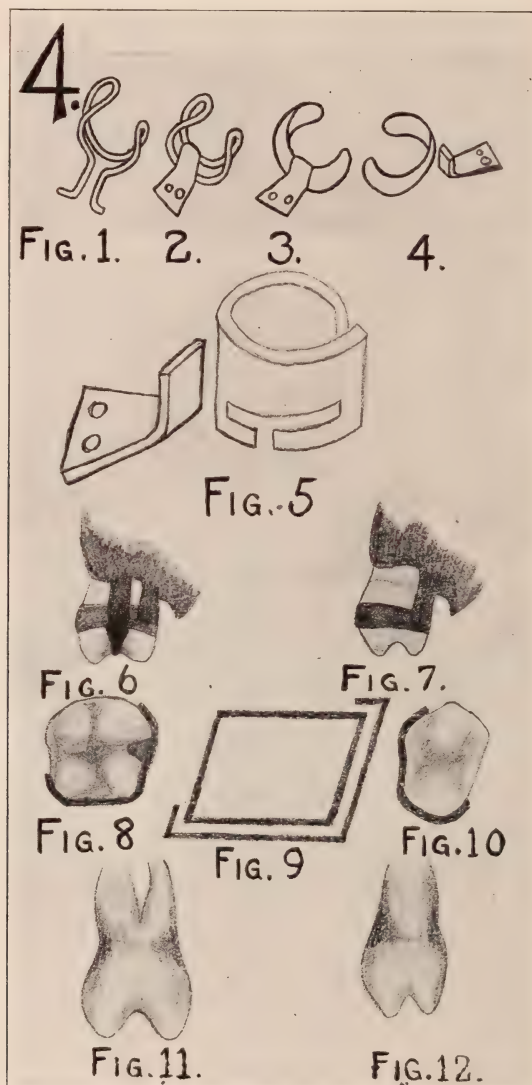
In cases where there are decided undercuts formed by leaning or bell-shaped teeth the sectional method should be employed. This consists of taking separate sectional impressions of the abutment teeth and parts on which the saddles are to rest. The sections are then bound together, forming cores, over which a general impression is taken. By this method an accurate impression of all exposed surface of the abutment teeth may be obtained, which is necessary in cases where clasps of any kind are to be used. Considerable compression of the soft tissues may also be obtained, which is an additional advantage.

PLASTER OF PARIS IMPRESSION.

In cases where the impression will draw, or by using wax or cores of any kind it can be made to do so, select a tray of suitable size and reinforce with wax in such a manner that when the plaster is introduced into the mouth it will be compressed around the teeth and against the soft parts firmly enough to get an exact copy. When plaster has hardened, force plaster and tray out intact.

"In cases where there are undercuts or leaning teeth the removable tray method will be indicated. In this method little or no wax reinforcement should be used. Select a tray that is as near as possible the size and shape desired, and if any reinforcement is used be sure it forms no undercuts that will prevent the withdrawal of the tray from the hardened plaster. Oil or vaseline the surface of the tray to be occupied by the plaster. After filling the tray, introduce into mouth and compress plaster around the teeth and against the soft parts. When sufficiently hardened, remove the tray, leaving the plaster in the mouth. Next groove and notch the plaster in such a way that with a stout sharp knife it can be cracked out in sections which may be reassembled in the tray. This method requires study

and experience and the operator must at all times guard against accidents with the knife."



The impression is the foundation on which the success of the finished denture must stand or fall, so if we would be successful in

the field of partial denture construction we must first of all learn to take good impressions.

THE MODEL OR CAST.

The models or casts on which we are to construct partial dentures should be sharp in outline, accurate in detail and strong and hard enough to withstand working upon without breakage or defacement.

Plaster of paris has been the standard material for model making ever since modern dentistry began and for general all around use has no equal for that purpose. It has deficiencies, however, the greatest of which is its lack of strength. Here again, let me urge that care be taken in following out the proper technique in mixing plaster, for the strength and hardness of the plaster model will depend largely upon this procedure.

There are several materials now available with which models can be constructed that will be harder and stronger than the plaster model, but none of them are so easily manipulated or so well adapted to partial denture work.

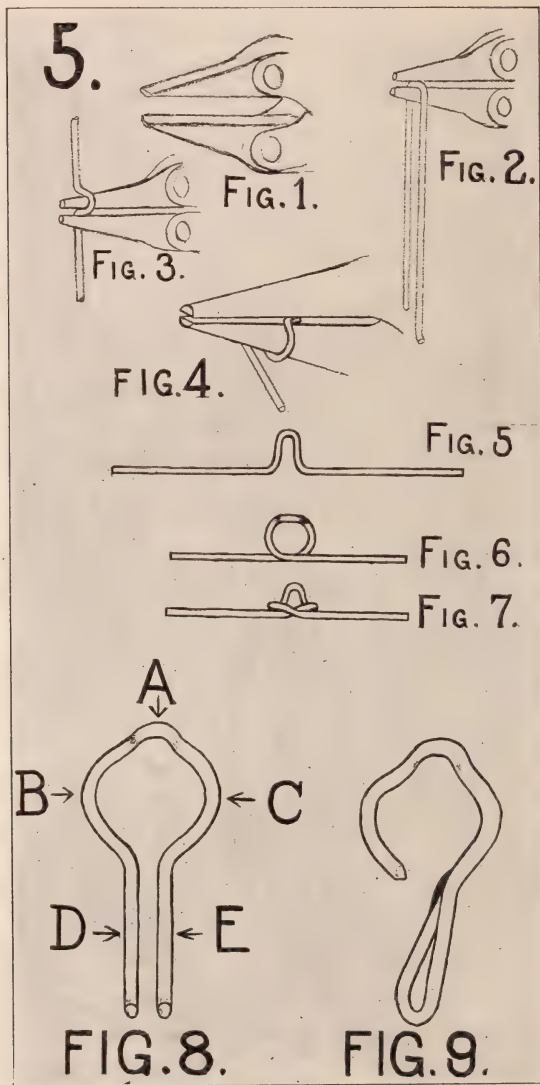
We are indebted to Dr. F. E. Roach, who has given us so many good things in dentistry, for suggesting and working out the technique of constructing a model for partial denture work that is in many ways ideal.

This method consists of constructing a plaster model, on which certain parts of the impression are reproduced in "Modelite," a material of his own invention, which is much harder and stronger than plaster.

The advantages of this method are that the parts of the model upon which it may be necessary to construct or adapt clasps or metal work of any kind will be strong and hard enough to permit of working upon without danger of breakage or defacement and of soldering or vulcanizing upon as well, if it is so desired.

To construct a model of this description we would proceed as follows: After preparing the impression for separation, mix the modelite to a stiff putty-like consistency that can be molded with the fingers into a cone-shaped mass. Then with a suitable rounded instrument pack it into the depressions made by the teeth, to which clasps are to be fitted and such other parts as it may be desirable to reproduce in this material. Before the modelite begins to set, insert

common iron or brass screws in such a manner that the threaded portion will become imbedded about two-thirds their length, leaving



the heads free to become imbedded in the plaster with which the remainder of the model is to be constructed. As the modelite would

adhere but slightly to the plaster, the screws are used to hold it firmly upon the model. Chart No. 1, Fig. 1.

Allow from ten to twenty minutes for the modelite to harden before running up the plaster model. When plaster has hardened and the impression separated from it, we will have a plaster model on which such parts as we desired have been reproduced in a material that because of its strength and hardness can be worked upon with accuracy and safety. Chart No. 1, Fig. 2.

In cases where crowns or inlays are to be used in conjunction with clasps or some form of attachment, the all-plaster model will generally be indicated.

Accurate and adequate impressions and models are the factors which contribute in the largest measure to the proper adaptation of our partial dentures and by making accurate construction possible also contribute to the conservation of the remaining natural teeth and adjacent tissues.

PLATE OUTLINE.

Faulty plate outline has been responsible for much of the destruction wrought by partial dentures in the past. It has been the practice for many years to use outlines which permitted the plate to come into contact with the lingual surfaces of the remaining natural teeth, with the sharp points of the festooned plate margins projecting into the interproximal spaces, where they often caused irritation to, and eventually destruction of, both teeth and gums. Chart No. 2, Figs. 2-4.

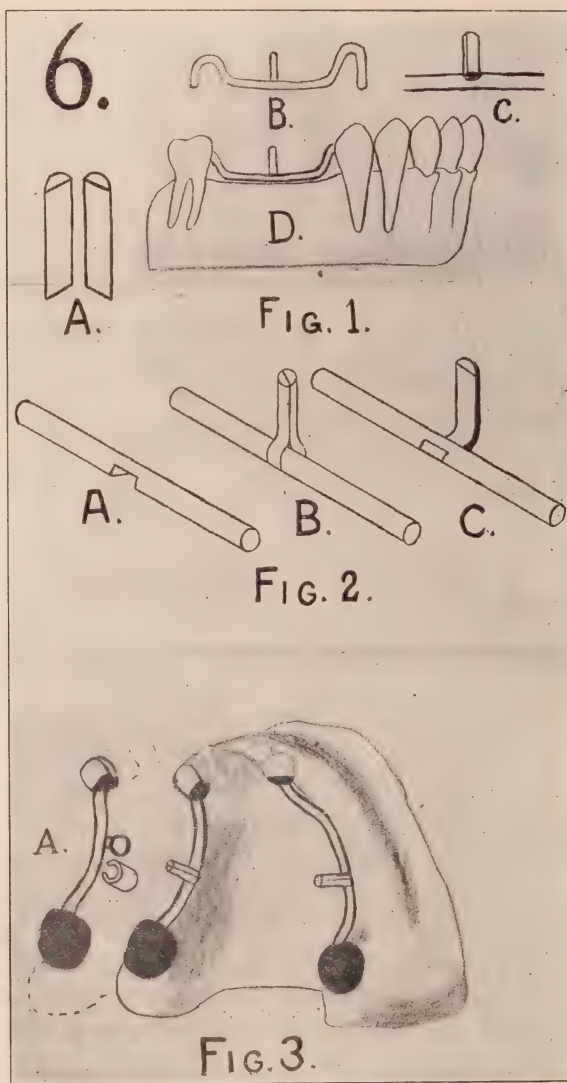
This was in many cases unavoidable; for, to give sufficient strength and rigidity to the denture it was necessary to cover all available surfaces, and to aid in securing adequate retention advantage was often taken of the undercut formed by the lingual contours of the natural teeth.

The advent of the lingual and palatal bar constructions, together with many new and efficient retentive appliances, has made it possible to adopt better plate outlines, which in a large degree obviate the injurious and destructive tendencies of the older forms of partial dentures.

THE LINGUAL BAR DENTURE.

On Chart No. 1, Fig. 2, the metal construction for a vulcanite-lingual bar denture is shown.

With this form of lower partial denture construction, especially where the posterior teeth are to be supplied, most satisfactory plate



outlines are obtained. Here the saddles are united by a strong round 11 or 12-gauge clasp gold wire, which gives strength and rigidity to the denture and when properly placed will in no way cause

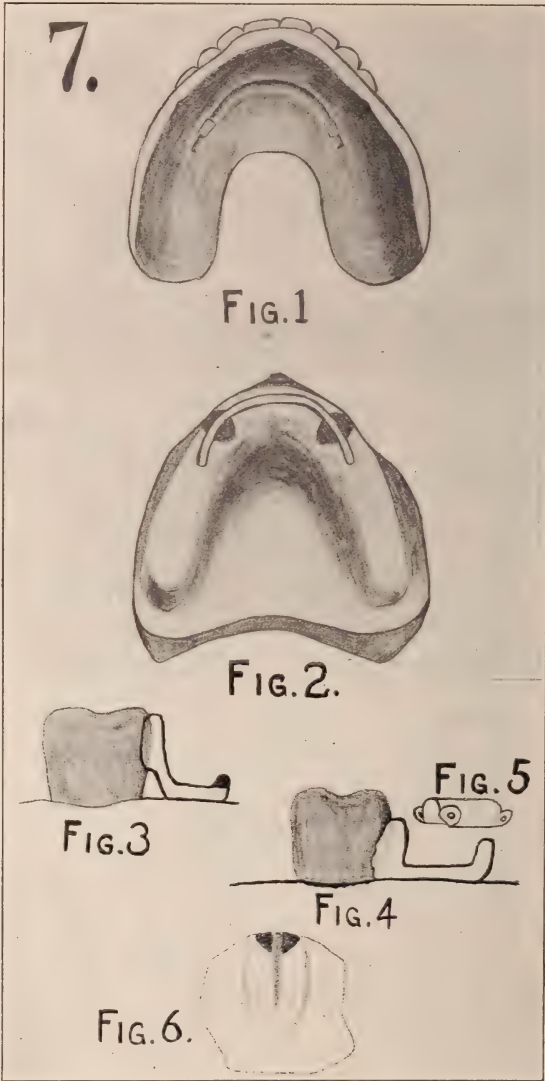
injury to the natural teeth or adjacent tissues. The bar should be adjusted well down beneath the tongue and at a distance of about $\frac{1}{16}$ of an inch from the gum. The proper placing of the bar is most important and care must be taken to so adjust it that there will be no danger through the settling of the denture of its coming into contact with the soft tissues. Some operators prefer the elliptical wire for lingual bars, claiming it is stronger than the round wire and on account of being somewhat flattened, more easily adapted and less in the way of the tongue. It may be said, however, that the round wire is fully as strong and will be found best suited to the majority of cases.

It will be noticed that the bar extends from a position just posterior to the second molar, around the lingual surface of the alveolar ridge to a like position on the opposite side of the arch, forming the lingual border of the plate. This is done to insure strength and rigidity to the denture. Vertical stays made of about 14-gauge clasp gold wire are soldered to the bar in such position as to hold the vulcanite firmly in place. Clasps or attachments are secured to the denture either by imbedding in the vulcanite or by soldering to the metal construction, or both. On Chart No. 8, Fig. 1, the construction for a metal base lingual bar denture is shown.

A high order of skill is required to successfully construct a denture of this description. It must be strong, rigid and well adapted to the parts on which it rests. The bar must be properly placed as heretofore described, and whether the denture is retained by clasps or other forms of attachments, they must be carefully and skillfully adjusted to prevent undue leverage or stress upon the teeth to which they are applied and obviate any possibility of their changing positions in such a manner as to come into contact with the gum. Care must also be taken that the saddle margins are not allowed to extend too far over the soft tissues, for if they should cause irritation and it becomes necessary to shorten them after the work is finished, it will be difficult to do so without destroying the wiring or otherwise disfiguring the denture.

To obtain sufficient rigidity and prevent the saddles from becoming bent or sprung out of proper seating, the bar should be extended along their entire lingual borders, joining with the wiring at the posterior plate margin (Chart No. 8, Fig. 1). To further stiffen the construction heavy wire braces or stays should be adapted and

soldered, extending from the bar transversely across the saddles. The stays will also serve as a means of attachment for the vulcanite.



THE PALATAL BAR CONSTRUCTION.

On Chart No. 3, Figs 1, 2, 3, the palatal bar construction is shown. In this construction the same advantages obtain in regard

to plate outline as with the lingual bar; the principle being applied instead to the upper denture. A flat rounded bar or band (usually of gold) is adapted to and extended across the palatal arch uniting the saddles or parts, which are retained in position by suitable attachments.

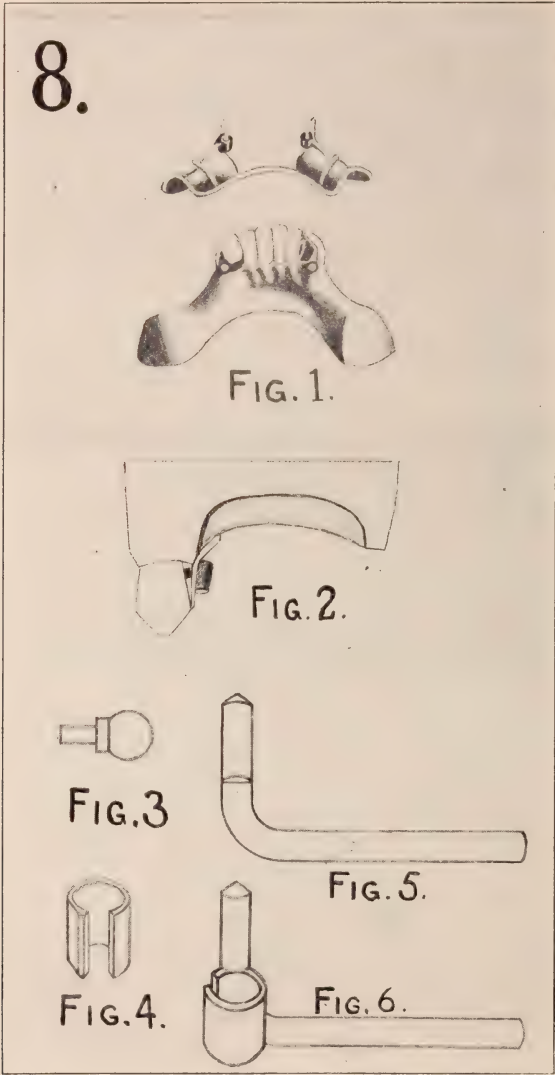
These bars may be constructed in different ways either by casting, swaging, or by using half-round clasp gold wire. If they are to be cast a stiffener of clasp metal should first be conformed to the arch and the wax pattern formed over and around it, so that it will be included in the casting. This will prevent bending and add greatly to the strength of the bar.

If the swaging method is employed, two thicknesses of 22-K., 28-gauge gold plate swaged and soldered together will ordinarily be found sufficient for strength, but if this is not rigid enough a doubler of clasp metal should be added. In some cases an 8 or 9-gauge half-round clasp metal wire may be used, as shown on Chart No. 3, Fig. 3. This construction is for a vulcanite case showing the method of attachment to the saddle.

The palatal bar form of denture is generally indicated where the upper posterior teeth are to be supplied as shown on Chart No. 3, Figs. 1-3, and Chart No. 2, Fig. 3. It is also useful in cases where the posterior teeth are to be supplied on one side of the arch only (Chart No. 3, Fig. 2). In such cases a saddle supplying the missing teeth may be retained by a bar extended across the arch and secured by a suitable attachment to a crown or bridge on the opposite side.

In constructing these cases, as well as in all cases where metal bases or saddles are used, the attachments should not be finally adjusted and soldered in position without first placing the abutments and saddles back in the mouth and taking a supplemental modeling compound impression while they are being held tightly in place against the soft tissues. This is necessary to insure their proper relations while under compression. From this impression a model is run up in investment compound on which the attachments and parts are soldered in place. Experience has shown that, however perfect the first impression and model may be, changes are apt to take place in the model, usually through expansion, which if the parts are united upon it will materially interfere with their proper relations and adaptation to the tissues upon which they are to rest. It is also found that unless the above precaution is taken the yielding of

the tissues under the stress of mastication will eventually force the saddles out of position sufficiently to destroy the occlusion and in



some cases cause the attachments to become out of proper adjustment. Furthermore, there is danger of the saddles settling sufficiently to allow the bar or base to rest too heavily upon the unyield-

ing tissues of the hard palate, which would cause the denture to rock, producing both discomfort and harm.

In regard to conservation, as pertaining to plate outline, it may be said that we should, as far as possible, choose outlines which allow the plate to extend over only such parts or areas of tissue as may be necessary for attachment of the missing teeth and retentive appliances and to give strength and proper seating to the denture, avoiding, whenever possible, bringing the plate margin into contact with the remaining natural teeth.

On Chart No. 2 a few plate outlines are shown in which the old forms are contrasted with the new.

RETENTION.

Attachments or appliances used in the retention of partial dentures can, for convenience of description, be divided into two groups or classes, "Band or Wire Clasps" and what may be termed "Commercial Attachments," such as are patented and placed upon the market.

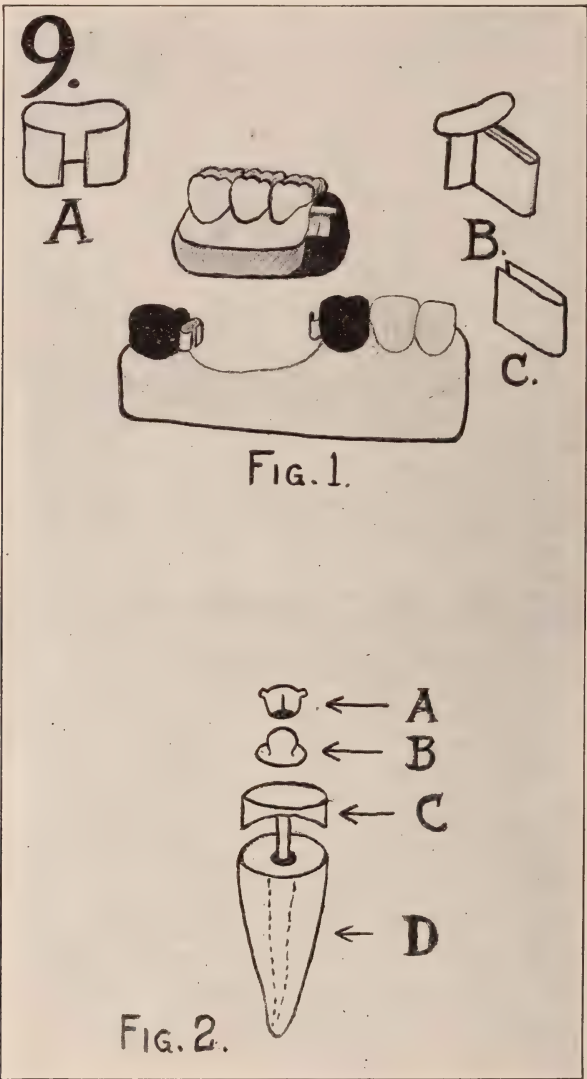
To attempt to describe in detail the many forms of attachments and clasps with indications for their use would be laborious and in a way impossible, for none of them are adapted to universal applications, their proper use depending entirely upon the problem of retention presenting in a given case. I will, however, briefly consider some of the attachments and clasps most in use, together with one or two new forms, which because of their value should claim our attention.

THE BAND CLASP.

On Chart No. 4, Figs. 6, 7, 8, 9, 10, the band clasp is shown with some of the details of its construction and adaptation, together with a modification of this clasp devised by Dr. E. A. Royce (Fig. 5). The band clasp is perhaps the most universally used of all retentive appliances. While it is now being decried by many operators, I believe it still has an important place in partial denture construction. For, when properly constructed and adapted to well-formed, healthy teeth, it is no more objectionable than many other forms of attachments.

We are told "never to use a band clasp on the natural teeth without first crowning such teeth." This radical means whereby the destructive tendencies of band clasps are supposed to be mitigated

is in itself so destructive in principle that the advisability of its general application can be questioned.



Where the teeth to which it is desirable to adapt this clasp are ill-shaped or badly broken down, they should of course be crowned, but to mutilate a good, sound, well-formed natural tooth to the extent

that would be necessary to devitalize and place a crown upon it, with all the uncertainties incident to such procedures, simply to guard against possible harm from a well-fitted band clasp is, I believe, unwarranted and from the viewpoint of conservation most inconsistent.

The chances are, that in the majority of cases, where band clasps are properly fitted and undue leverage guarded against, together with the possibility of the clasp changing its position on the tooth in such a way as to impinge upon the gum, that teeth to which this form of attachment is applied will serve for years with efficiency and comfort. If in time the teeth become troublesome the pulp can then be devitalized, the teeth crowned and their usefulness prolonged. Figure 7 shows the band clasp properly adapted to a bicuspid tooth. It will be observed that the clasp is fitted about the contoured portion of the tooth, extending well toward the occlusal surface and placed far enough away from the gum to insure its safety from injury. In Figs. 6-8 the clasp is shown provided with an occlusal rest or stay to prevent its changing position on the tooth in such a way as to come in contact with the gum.

The occlusal rest is made by soldering a wire lug or spur to the clasp band and adapting it over the marginal ridge, extending either into the mesial or distal fossia, as the case may require. The importance of these rests or stays should not be overlooked, for the greatest harm caused by band clasps is that which obtains when they are permitted to crowd upon the gum.

To retain a partial denture firmly in position with band clasps, they must correctly grip the teeth. This is accomplished by forming the clasp bands so that they will extend around two sides and three angles of the teeth to which they are applied (Chart No. 4, diagram Fig. 9).

The Royce modification of this clasp (Fig. 5) is made by slitting the gingival third of the band and cutting it open in the center, forming two flexible springs or wings, which are adapted underneath the contoured portion of the tooth, where they add greatly to the retentive qualities of the clasp.

WIRE CLASPS.

Wire clasps are made in various forms from both round and half-round clasp gold wire and because of their slight contact with

the tooth surfaces are considered less liable to cause decay than are band clasps.

The single strand form of round wire clasp is mostly used where retention is desired without the clasp becoming conspicuous.

The double strand or so-called basket form of round wire clasp (Chart No. 4, Figs. 1-2, is, on account of its flexibility, adaptable to clasping teeth with large contours, such as bell-shaped bicuspid and molars.

The flat or half-round wire clasp (Chart No. 4, Figs. 3-4), having a better grip upon the tooth surface than the round wire clasp, is indicated in clasping short straight-sided teeth.

The disadvantages in the use of wire clasps (of the older forms, at least) have been that they usually lacked sufficient strength and firmness of grip upon the teeth to give adequate retention and were easily bent or distorted so as to become out of adjustment.

Some new forms of wire clasps have recently been devised, however, which are practical in many cases where the older forms were found wanting. On Chart No. 5 one of these forms, known as the "Wire Loop Clasp," is shown, together with the details of its construction.

THE WIRE LOOP CLASP.

This is a new and somewhat novel form of round wire clasp recently introduced by Dr. F. E. Roach and because of its proven efficiency and usefulness should claim our attention and consideration.

This clasp differs from other forms in that it grasps the tooth mesio-distally instead of bucco-lingually, and, it is claimed, will grip the teeth tighter, is less conspicuous in the mouth and less liable to cause decay than the band clasp.

Wire loop clasps are made in two forms—the continuous loop form (Fig. 8) and the open loop form (Fig. 9), both of which are designed to be used upon the natural teeth.

They are constructed from round, high per cent platinum and gold alloy clasp wire; 20 gauge being used for the continuous loop form and 18 gauge for the open loop form. As these clasps are designed to be used upon both the cuspid and bicuspid teeth, it will be necessary to avoid confusion in describing the tooth surfaces to which they are applied to designate which tooth is meant. Let it

be understood then that the following description pertains to their adaptation to cuspid teeth.

In describing this clasp it may be said to consist of a vertical bow (Fig. 8-A) a labial and lingual horizontal span (Fig. 8 B-C) and the labial and lingual terminals (Fig. 8 D-E).

The vertical bow (A) arches over and rests upon the mesial surface of the tooth to which the clasp is applied just incisally of its contact with the proximating tooth; extending along the mesio-labial and mesio-lingual angles to a point near the gingiva, where it joins the labial and lingual horizontal spans. The labial and lingual horizontal spans (B-C) extend around the labial and lingual curvatures resting upon the enamel near the gingiva, to a position about in the center of the gingival third of the distal surface where they join and become continuous with the labial and lingual terminals (D-E) which are bent backwards along the alveolar ridge. The technique of their formation is as follows:

THE CONTINUOUS LOOP FORM.

A wire of suitable length and gauge is bent over the beak of a small round-nosed plier, forming a hairpin-shaped loop (Fig. 2). The wire is then grasped with the pliers at a proper distance from the bend to give the right height and the free ends bent at right angles, forming the vertical bow. (Figs. 3-5.) The vertical bow is then grasped between the beaks of a pair of large round-nosed pliers, one beak of which has been ground flat on its contact surface and the free ends of the wire bent around the under side of the flattened beak forming the labial and lingual horizontal spans (Figs. 4-6). The free ends or terminals (Fig. 7) are now bent backward along the alveolar border, where they are used for attaching the clasp to the denture as shown in Fig. 8. The labial and lingual spans are then further adapted to the gingival curvatures with the concavo-convex pliers, Fig. 1.

OPEN LOOP FORM.

The open loop form (Fig. 9) is obtained by simply cutting off the labial terminal at its junction with the labial horizontal span and bending the lingual terminal back upon itself and soldering it to the lingual horizontal span.

Occlusal rests may be formed by bending one of the terminals back upon itself and adapting it to the occlusal surface, or by solder-

ing a suitable wire to the clasp for the purpose. The continuous loop form is used in clasping cuspids and all cone shaped, straight sided or short teeth, and the open loop form for bell-shaped teeth, particularly the bicusps. Considerable skill is required in forming these clasps and to become proficient it will be well to practice with brass spring wire until the technique is mastered.

PLIERS.

To be properly equipped for the work it is necessary to have suitable pliers. The Bernard light pattern parallel jaw pliers as shown on Chart No. 5 are nicely adapted to the purpose and can be obtained from any hardware dealer at small expense. The following shapes and sizes are used: Small round nose No. 104, size $4\frac{1}{2}$ inch (Figs. 2-3); small half-round nose with concaved and convexed jaws, No. 107, size 5 inch (Fig. 1); Paragon round nose No. 201, size 6 in. (Fig. 4), one jaw of which must be ground flat on its contact surface; and the small chain plier No. 106, size $4\frac{1}{2}$ inch. This plier is not shown upon the chart.

SUGGESTIONS.

Wire loop clasps can not be successfully made on all plaster models. A model such as already described for this work, or one having the same requisites, must be used. They require accurate fitting to and definite placement upon the teeth to which they are applied and must be constructed upon a model that will not only be strong and hard enough to permit of their being properly fitted and adapted, but on which they can also be maintained in proper placement while being attached to the denture either by soldering or vulcanization.

Care should be taken in making abrupt bends in clasp wire that it be well annealed at place of bending to prevent breakage. The spring can be restored by rubbing vigorously with a flat burnisher. To prevent the clasp settling and impinging upon the gum, occlusal rests should be provided or a slight notch or shoulder may be ground on the mesio-occlusal surface of the tooth forming a rest for the vertical bow. This is sometimes necessary to allow the vertical bow to pass over without interfering with the occlusion.

In soldering it will be best to protect the wire with investment to prevent burning and use nothing higher than 18-karat solder.

THE ALVEOLAR BAR SPLINT.

The alveolar bar splint (Chart No. 6, Fig. 3) is a most valuable and efficient adjunct to both partial denture and removable bridge work construction. It consists of a round clasp gold wire or bar of about 14 gauge which is adapted to the alveolar ridge and extended across the space between two or more abutments to which it is securely attached in the form of a splint.

In connection with suitable attachments, alveolar bars are used in retaining partial dentures and removable bridges. Acting as splints they also serve to bind the abutments firmly together, which is of advantage especially where the abutting teeth are somewhat loose or the conditions are such that they are liable to become so.

The bar is placed in the center of the alveolar ridge resting slightly upon the gum and arched occlusally near its attachment with the abutments to provide interproximal space and prevent injury to the gingival tissues (Fig. 1-D).

The denture or bridge is adapted or fitted over the bar which rests in a groove formed on the underside of the saddle for its reception. The retentive devices or attachments are secured to the underside of the saddle and applied to the bar as it rests in place in the groove. These bars may be attached to various kinds of abutments such as gold crowns, Richmond crowns, gold inlays or cast copings. They may also be attached by bending the ends of the bar at right angles and inserting them into pulpless teeth where they are secured in place with amalgam (Fig. 1-B). The retentive devices mostly used in connection with the alveolar bar are the vertical post, Gilmore and Roach attachments.

VERTICAL POST ATTACHMENTS.

These simple and effective retentive devices are useful in many cases where the alveolar bar is employed. They are made in two forms—the so-called “split post” form which is most commonly used, and the “solid post” form.

The split post form (Fig. 1-C and Fig. 2-B), as its name implies, consists of a split clasp metal post which is secured in a vertical position upon the alveolar bar where it is extended into hole in the saddle of a bridge or denture which is fitted over the bar. Retention is produced by friction of the expanding post upon the sides of the hole in the saddle.

The solid post form (Fig. 1-D and Fig. 2-C) consists simply of a clasp metal post which is secured to the bar and employed in the manner described for the split post form. Retention is produced by slightly bending or canting the free end of the post either buccally or lingually causing it to bind upon the sides of the hole. In using these attachments it is necessary that they be secured to the bar in such a manner as to preclude any possibility of their being broken off; for in such event serious trouble would ensue, as they could not be replaced without removing the bar construction from the mouth.

Two methods for this procedure may be employed. By one the attachments are fitted to and soldered upon the occlusal surface of the bar, while in the other they are secured by mortising and soldering to its underside. Each of the two methods require a separate construction of the split post form. When secured to the occlusal surface this form is constructed as follows:

Two pieces of half-round clasp gold wire (usually about 14 or 16 gauge) are cut of sufficient length to extend entirely through the saddle to the occlusal surface (Fig. 1-A). The flat sides are placed together, antiluxed, wired and soldered for about one-fourth their length. The post thus formed is then placed in a vertical position with the soldered end upon the bar at convenient location between abutments and firmly soldered to place (Fig. 1-C). A thin piece of gold or platinum plate is then wrapped about the post, fitting it loosely so that it will pull off with the wax saddle and when vulcanized will form a lining to the hole in the saddle into which the pin is to be fitted. When the case is finished the post is dressed down flush with the occlusal surface and the free ends slightly expanded to obtain friction upon the sides of the hole. The object of extending the post entirely through the saddle is to make the hole more accessible for cleaning.

The other method recently suggested by Dr. F. E. Roach requires a different construction of the split post form as follows:

A mortise (Fig. 2-A) is cut on the under side of the alveolar bar of sufficient depth to contain the half-round wire with which the post is to be made. The wire is then fitted into the mortise and securely soldered to place—after which the free ends are wrapped around the bar, bringing their flat sides together above where they are formed into the vertical portion of the post (Fig. 2-B).

The solid post form (Fig. 2-C) is secured to the bar in a similar

manner and extended occlusally on the lingual side of the bar. This is an advantage in that it leaves more room on the buccal side of the bar for setting up the teeth.

This manner of constructing and securing these attachments to the bar eliminates the danger of breakage and also adds to their efficiency by materially increasing their length.

THE GILMORE ATTACHMENT.

Because of its effectiveness in operation and simplicity of technique in employment, this attachment has gained wide popularity among members of the profession as a retentive appliance. On Chart No. 7 a few illustrations are given showing the attachment and manner of its application to the alveolar bar.

It consists of a split or open-sided tube of clasp gold or special metal, to the sides of which suitable anchorage devices are attached by which it is secured to the denture. The attachment is made in two forms and of different metals for use in either vulcanite or metal construction. Those made of special metal are designed for use in vulcanite, while the clasp gold attachment is suitable for use in both vulcanite and metal constructions.

One form of the attachment is provided with an anchor arm on the lingual side only, and is used in short-bite cases where the space on the buccal side of the alveolar ridge must be left free for the placing of the artificial teeth. The other form is provided with anchor arms extending both lingually and buccally, leaving the wings or lips of the attachment free to be sprung over and grip the bar. This form is the stronger and is used where a considerable amount of retention is required (Fig. 5).

The application and operation of this attachment is quite simple. It is attached to the underside of the saddle of a bridge or denture where it is applied to an alveolar bar over which the saddle is fitted. The bar rests in a groove formed in the under side of the saddle and the attachment secured above and around the groove in such a manner that the wings or lips of the tube will be sprung over and grip the bar as the denture is forced to place (Fig. 1-2). These attachments are principally indicated for use in cases where the alveolar bar is firmly secured to two or more strong abutments (Chart No. 6, Fig. 3).

They are also used on short extension bars, one end only of

which is attached to an abutment, allowing the free end to extend along the alveolar ridge for sufficient distance to apply the attachment (Chart No. 7, Figs. 3-4). In attaching these bars to crowns or other forms of abutments they must be so formed and placed that when attached there will be sufficient interproximal space to protect the gingival tissues as shown in (Fig. 3). Under no circumstances should they be attached as shown in Fig. 4. In some cases the free ends of the bars should be provided with a stop, formed either by a soldered lug (Fig. 3) or by bending the end of the bar occlusally as shown in Fig. 4, to prevent the saddle from drawing away from the abutment, causing the attachment to be forced out of position or detached from the bar.

It is desirable in some cases to use roots for abutments without placing crowns upon them, which necessitates the construction of suitable copings for attachment of the alveolar bar.

It is a well-known fact that the gum has a tendency to creep or grow over the margins and upon the occlusal surfaces of copings which are placed on the level with or slightly below the gum line. To obviate this tendency and to prevent the gum from being injured by the saddle, copings used for abutments in these cases should be so constructed as to extend for at least one-thirty-second to one-sixteenth of an inch above the gum line. They may be made with bands and with the occlusal ends cast, or by fitting a post, building up with inlay wax and casting in the manner of pin inlays (Fig. 6).

Fig. 2 shows the alveolar bar attached to coping abutments, the bar being extended for a short distance beyond them for the purpose of applying the attachments. This construction is particularly useful in adapting full lower dentures where suitable roots for abutments are available.

TECHNIQUE FOR USE IN VULCANITE CONSTRUCTION.

The abutments are prepared the same as for fixed bridge work and an impression taken with the abutments in place in the mouth. Before pouring the model, line the inner surface of crown bands with a small amount of wax distributed with a hot spatula. If the abutment be a Richmond crown or post inlay, wax the post. After the model has been separated from the impression, apply sufficient heat to soften the wax. Remove abutments, boil out the wax and replace them in their original

positions upon the model. Fit and place an alveolar bar as previously described, wax to abutments, remove, invest and solder. Replace abutments and bar upon the model. The attachment may now be put in place upon the bar and the usual method of waxing up proceeded with. Before packing, remove the attachment from the bar and spread oxyphosphate cement along the sides of the bar to obliterate the undercuts. This precaution is necessary to prevent the rubber from flowing under the wire. The attachment should then be opened slightly so that it will go over the bar easily and a piece of thin cardboard fitted to its inner surface to allow room for settling of the saddle, after which it is again placed upon the bar. The case is now ready to be packed and vulcanized. Before packing the rubber paint the model, wire and abutments with liquid silex. While still moist burnish thin tin foil over model and wire and force clasp to place through the foil. When the case is vulcanized and finished, the abutments with the bar are cemented in position in the mouth, the attachments slightly closed to cause tension upon the bar and the denture pressed to place.

PLASTIC VULCANIZABLE GUTTA-PERCHA METHOD.

Very satisfactory partial dentures can be constructed by this method, the technique of which is as follows:

Having the abutments and bar in place upon the model, spread a little temporary stopping along the sides of the wire, apply liquid silex and tin foil as described above and force the clasp to place through the foil. Dissolve some of the gutta-percha in chloroform and paint that part of the model with the solution that is to be covered by the saddle. Strips of vulcanizable gutta-percha may now be spread on the model with a hot spatula and manipulated like wax. If desirable a veneer of pink rubber may be spread on with a hot spatula and the case vulcanized for two hours at 310%.

The advantages of using the Gilmore attachment are that it is simple and effective in operation and in connection with the alveolar bar is easily employed in a large range of cases.

Of the disadvantages it may be said that they are not adjustable enough to permit the saddles to become adapted to changes which may take place in the tissues beneath them or to possible changes in the position of the bar. As they require

maintenance in definite and accurate relationship with the position of the bar in order to obtain sufficient grip upon it to retain a denture, any slight change in the position of either the bar or saddle will be liable to throw them out of adjustment and render them useless as retentive appliances. The general use of the extension bar, which is attached by one end only, cannot be too strongly condemned. For however carefully a saddle may be fitted over these bars, sooner or later it will settle and force the bar toward the gum. This will not only produce tremendous leverage upon the tooth, but in many cases will drive the bar deeply into the tissues and cause serious trouble. There may be cases where the use of the extension bar would be justified, but in most cases it will be better to resort to other means of obtaining retention.

THE ROACH ATTACHMENT.

The principle on which this attachment operates is perhaps the most effective in producing retention with the least amount of leverage upon abutment teeth of any of the commercial retentive appliances.

It consists of a solid 20 K. gold or platinum ball with stem for attaching to abutment (Chart No. 8, Fig. 3) and an open sided 24 gauge clasp gold tube which is attached to the denture (Fig. 4). The ball is attached to the abutment close up to the gum line slightly lingually to the center of the alveolar ridge. Retention is obtained by the tube, which is attached in a vertical position to the saddle of the bridge or denture, being telescoped over and gripping the ball, which enters its gingival end; the stem passing through the open side of the tube.

This attachment is similar in its action to a ball and socket joint. The tube, being free to move or rotate in all directions, permits the saddle to become adjusted to changes which may take place in the tissues on which it rests without in any way interfering with the efficiency of the attachment or producing leverage upon the abutment tooth.

The ball may be attached to any form of abutment such as gold or Richmond crowns, gold inlays or lingual hoods, and as the tubes do not require definite paralleling the attachment is easily employed in all cases where retentive devices other than the various forms of clasps are indicated. This attachment can

also be used in conjunction with the alveolar bar construction by soldering the ball on the lingual side of the bar (Chart No. 6, Fig. 3-A). As the effectiveness of this attachment depends largely upon the position and manner of securing the ball to the abutment, the following technique for this procedure is given:

After completing the crown or coping and adjusting it to place in the mouth, the location for attaching the ball is marked upon the band. This should be about $1/32$ of an inch from the gum line and far enough lingually to the center of the alveolar ridge so that the attachment will line up with the lingual surface of the teeth and allow room at the buccal side for placing the artificial teeth. Remove crown or coping from the mouth, drill hole size of stem on the ball at point marked on the band. Cut stem on ball short so that it will not project inside of band, fit and solder to place. The ball may also be attached by cutting the stem off flush with shoulder and soldering to crown band without drilling a hole. In attaching to cast gold inlays the stem should be cut off at the shoulder and the ball soldered to the surface of the inlay.

The tubes are attached to the denture by clasp gold stays or contact bars. The contact bar consists of a clasp gold wire bent at right angles, flattened on one side, and soldered to the side of the tube (Chart No. 8, Figs. 5-6).

These bars serve a double purpose. They are not only a means whereby the tube is attached to the denture, but by being extended occlusally so as to rest upon the distal surface of the abutment tooth, at the contact point, they also prevent the denture from tipping or dropping out of position in the back (Chart No. 8, Fig. 2). After the ball has been attached, the crown or inlay is replaced upon the abutment tooth, an impression taken and a model run up. If metal base is used it should be placed in the mouth at this time and held tightly against the tissues while impression is taken. After model is completed the tube and contact bar are fitted and placed in position upon the ball and if it be a metal case, soldered to the saddle without being removed from the model. This will prevent any changes taking place in the relationship between the tube and ball. In placing the tube care must be taken that it is not extended too far gingivally over the ball. If this is done the settling of

the saddle may cause the ball to pass out of the occlusal end of the tube and destroy the efficiency of the attachment.

In attaching the tubes to vulcanite saddles the contact bar to which the tubes are soldered is provided with suitable stays to prevent rotation and imbedded in the vulcanite, or, in lingual bar cases, they may be soldered to the metal construction. In a metal case they would of course be soldered to the saddles as in Chart No. 8, Fig. 1.

The attachment is tightened by compressing the tube, thereby causing increased friction upon the ball. This is best accomplished by placing a piece of match stem or wire in the tube to prevent too much closure and pressing its sides together with suitable pliers. In soldering or vulcanizing, one side of the tube should be left free for this purpose.

(On Chart No. 8, Fig. 1) The correct position and location of the ball upon the abutment is shown together with the tube and contact bar in place upon the saddle.

The advantages of this attachment are that it has a wide range of adaptability and in operation produces little or no leverage upon the abutment teeth.

Its disadvantages are mainly in its bulk which in some cases makes it difficult to apply.

THE MORGAN ATTACHMENT.

On Chart No. 9, Fig. 1, the retentive device known as the Morgan attachment is shown. This attachment consists of two parts—the keeper or clasp and the anchor device. They are made both of special gold and iridio-platinum for use in the different forms of construction. The keeper (A) is a somewhat flattened and curved open-sided tube which is soldered to the abutment. The anchor (B) is a “T” shaped device constructed to accurately fit the inner surface of the keeper with a stem or shank for attachment to the denture. To facilitate its attachment the small gold loop (C) is furnished which may be soldered to the shank.

Retention is obtained by friction of the anchor device upon the inner surface of the keeper into which it is pressed, the shank passing through the opening in the side of the tube. This attachment is useful in certain forms of removable bridges such as

shown in (Fig. 1). It is objectionable, however, in many cases because of the leverage which is produced upon the abutment teeth through the settling of the saddles. Another disadvantage in its use obtains from the fact that its parts require definite paralleling, necessitating the use of a jig.

THE BISCHOF-OTRICH ATTACHMENT.

On Chart No. 9, Fig. 2, a new form of retentive device is shown called the Bischof-Otrich Attachment. This attachment also consists of two parts—a "ball" and a "clasp."

The clasp metal ball (B) is somewhat flattened and joined by a tapering shank to a disc-like base for attachment to the coping or abutment (C).

The clasp (A) which is attached to the denture consists of a clasp metal cap constructed with fingers or pedals which spring over and grip the ball as the clasp is pressed to place upon it. As this attachment has but recently been introduced its merits remain to be proven by the test of practical use.

In closing let me say that in constructing all forms of removable partial dentures, we should as far as possible avoid making them too complicated. It is also important in choosing attachments for retention that we adopt the form best suited to the case in hand however simple that form may be. In short, we should strive to adapt the attachment to the case instead of the case to the attachment.

It has been my purpose in this paper to describe more or less in detail the most important steps in partial denture construction together with some of the many forms of retentive appliances both old and new, endeavoring by so doing to bring the whole together in comprehensive form. I believe the importance of this class of prosthetic work is such that it should receive more attention on the part of the profession in general and if by presenting the subject in this manner I may have stimulated more interest in it, I shall feel that my effort has been worth while.

I wish also to state that some of the cuts and certain quotations are taken from Prof. Geo. H. Wilson's Manual of Dental Prosthetics, while the cuts showing the Gilmore, Roach and other attachments are taken from the descriptive matter issued by the manufacturers.

A SYSTEM OF POSITIVE AND PAINLESS TOOTH MOVEMENT.*

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Wonderful advances have been made in both the science and the art of orthodontia. Men of splendid mental capacity and wonderful technical ability have devoted their lives to its advancement, and where but a decade or two ago there was nothing of science, and but little of art, there now exists a splendid science and a beautiful art. The classification of mal-occlusion, the compiling of the knowledge of the causes of mal-occlusion, the advance in the knowledge of the surrounding tissues and the changes which take place in them incident to tooth movement, the improvement in types and designs of orthodontia appliances and the materials from which they are made are all worthy of our highest praise and commendation. The fame of the men who have done these several great works should be imperishable.

In offering criticism of the appliances now before the profession, your essayist wishes it distinctly understood that he is not criticising the appliances, for their day, nor their creators at all. They have been splendid appliances in their time. Their development marked distinct steps in the evolution of orthodontia appliances, but it would be foolish to assume that, in them, perfection had been reached, or that it ever will be reached. It is only by analyzing the faults of these appliances, and comparing them with the one to be shown at this time, that we can arrive at any just conclusions regarding the value of the new type, as *it* will be valuable only if it overcomes faults found in the existing appliances.

Let the essayist then point out some of the faults of the present-day appliances, as he sees them, and then consider the efforts he has made to overcome these faults.

First, we will take up the older appliance of expansion arch and wire ligatures, as that has probably been more generally used than any other.

Objections.—First—Any tooth movement secured by an appliance depending on the screw for development of force must be inter-

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mittent, and the force itself must rapidly vary in intensity, for a positive tooth movement is secured at the time the screw is tightened, and as the tooth moves the force rapidly lessens until in a short time no force is being exerted.

Second—Any movement secured by the tightening of non-elastic ligatures connecting a tooth and a rigid, or semi-rigid bar must be intermittent, and again the force rapidly lessens until none is exerted. Movements of this character tend to produce soreness, unnecessary loss of bone tissue, and require longer periods of retention than those secured by an appliance in which the force is constant and uninterrupted over a long period of time. The abrasion of the tongue and lips by wire ligatures is a serious fault. Other objections are found in the use of ligatures of any kind in the injury done to the gums, and because they furnish a lodging place for accumulations of food between the teeth. Decalcification frequently results in these places. Again the ligatures become loose and displaced, either through design on the part of the patient, or through accident or stress of mastication, allowing a recession of the teeth, consequent soreness and a retarding of the progress of the work.

Third—In the appliance depending on the screw, the force is developed at a point far distant from that to which it is to be applied, and must be transmitted through a long curved wire, which makes the application more uncertain than when the force is developed at, or near, the point where it is to be applied.

Fourth—The inability to lengthen any intermediate section of the arch often proves a very disagreeable feature, as, for instance, when the central and cuspid are lying in close approximation, or in contact, necessitating their being moved apart with but little labial movement; or in a similar condition in any curved part of the arch, where the teeth are to be carried along the line of occlusion, rather than labially. In such cases the movement mesially or distally without much labial movement is very difficult.

Fifth—The type of appliance under discussion usually depends on one tooth in each lateral half of the jaw for its anchorage, and they must bear the full amount of force necessary to move all the anterior teeth, which is frequently sufficient to tax their support beyond the limit.

Sixth—With this type of appliance, the teeth when moved must be tipped; their bodily movement is out of the question.



Fig. 1.

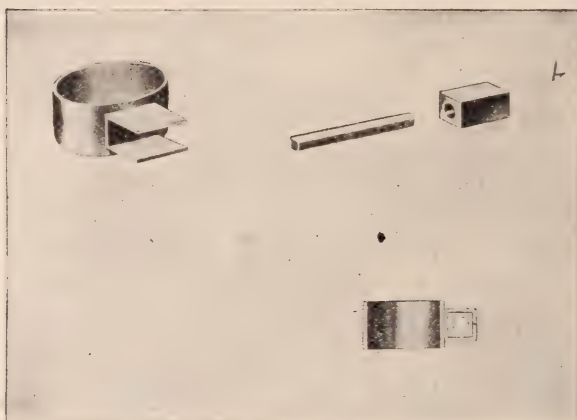


Fig. 2.

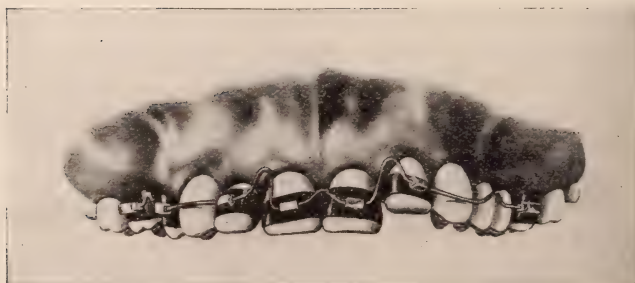


Fig. 3.

Seventh—The constant surveillance which it is necessary to keep over this appliance, and the frequent applications of force necessary to keep the teeth moving are distinct disadvantages.

Eighth—After a case has been completed the appliance must be removed and another constructed and adjusted in its place for retention. The construction of a proper retaining device often proves more difficult than the correction of the case itself. This is also a serious and unhappy time for the patient, as the construction of an appliance on teeth that have been moved, and are still loose, is usually a very painful operation.

Tube and Pin Appliance: Objections.—First—The technique necessary properly to construct and apply this device is so severe and exacting as to place it out of question, except in the hands of the most skillful technicians. Many of the men who have had their training in the construction and use of this appliance from the best authority, have given up its use, and others say they use it only occasionally.

Second—The wire when small enough to serve properly for root control is not strong enough to expand properly a mature dental arch without the use of loops, for which there is no provision. Many are securing their expansion with the older form of arch and finishing with this type.

Third—Root control is only feasible in a part of the arch. Those cases requiring great expansion, with consequent tipping of molars and bicuspid with the older appliances, are still being completed with the latter teeth badly inclined buccally.

Fourth—The rotation of teeth requires either the use of rubber wedges or ligatures.

Fifth—This appliance is subject to the same disadvantages of the abrupt application of force by the screw action as was the older form, but in a less degree.

Sixth—if a band breaks or becomes uncemented, it is necessary to remove the whole arch before the band can be replaced.

Your essayist is deeply sensible of the difficulty before him when he attempts to convince you that any appliance will meet and overcome all these objections, without itself developing other objections. To that end he will now show the appliance which he wishes to present, and its operation, after which he will take up the bad features of the other appliances as he has enumerated them, and we

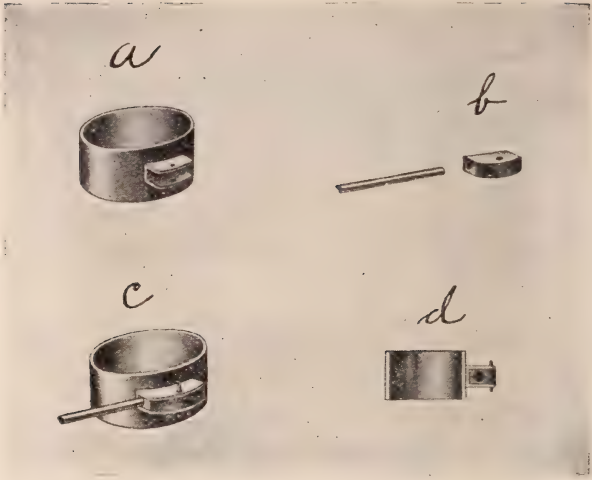


Fig. 4.



Fig. 5.



Fig. 6.

shall see if they have been met and overcome, or if he must be branded simply as an iconoclast—one who tears down and never builds up. After that it will be for you to say in your discussion whether the appliance, as he shows it, has other faults.



Fig. 7.

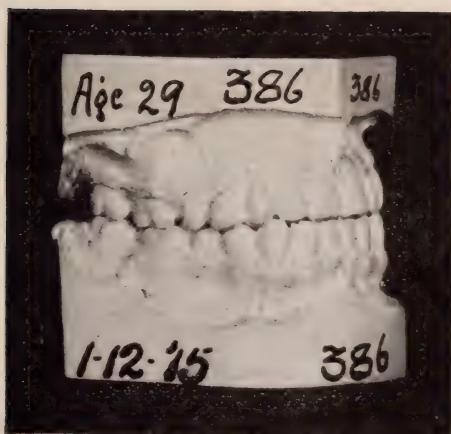


Fig. 8.

Except the force of gravity, there is probably no force in nature so constant in its operation as that of a coiled spring, as even the pressure of the atmosphere varies with the temperature, the elevation above or below sea level, etc. The coiled spring, in season and

out, high or low, hot or cold, always works and never varies. Closely allied to the coiled spring is the looped spring. It has all the advantages of the coiled spring, and has the further advantage that it lies in a flat plane. It is this force which we are to consider today, with a new form of attachment to the teeth.



Fig. 9.



Fig. 10.

With your permission, the essayist will digress long enough to explain some of the steps he has taken in developing the appliance. The appliance was first made with short, split, round tubings soldered to the labial surfaces of the incisor bands near the gingival line. The arch made of .022-inch wire was threaded at its

ends which were placed in tubes on the molar bands. The arch wire was engaged in the short split tubes, and at the points where it emerged, was bent sharply toward the incisal edge. It was allowed to extend nearly to the cutting edge, and was then bent at right angles and passed to the next tooth, when it was bent at right angles again toward the gingival line. When it reached the line of the split tubing it was bent again at right angles and passed through the next tubing and so on for each tooth (Fig I). By the proper bending of the wire, pressure could be brought to bear on the incisal ends of the teeth in the lingual direction, and at the same time it would pull labially on the gingival portion of the tooth. In this way the apices of the roots were moved labially, and the incisal ends lingually. The appliance as described, did very good work in certain instances, but its usefulness was restricted to a very small percentage of cases. The things of greatest interest learned were the length of time such an appliance would continue its pressure, and the absence of all soreness. After this, came the thought that better control could be secured if the rotation of the arch wire in the tubing could be prevented. To this end square split tubing was secured, and a square wire used, but a new difficulty immediately arose. When the wire was made into loops, it was found that no two loops had the same resistance, for a square wire bent in the direction of one side will not have the same resistance as though it is bent in the direction of a corner, and all the different angles between the flat side and the corner give different results. A triangular wire was then tried, then a flat wire with a groove on one side to provide means for locking into a suitable form milled from solid metal and soldered to the tooth bands, but they all presented difficulties. Then came the idea of squaring a round wire just at the points where it was to be locked to the bands. When a wire small enough to give just the right delicate resilience required for the work was squared, the squared portion was too small to handle, and when it was made large enough to handle, it was too stiff to give the results desired. After a period of study, came the idea of using hollow square blocks soldered on the arch wire at the places where the attachments were to be made (Fig. II.) That was the first real step in developing the present appliance. The ability to lock the arch wire itself into

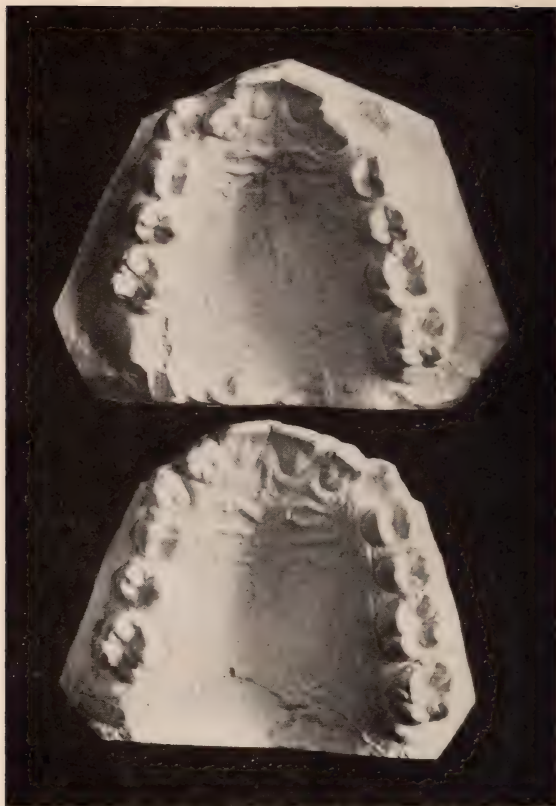


Fig. 11.



Fig. 12.

the seats without soldering on attachments was at first held by the essayist to be a necessity, but after once preparing an arch in this way, it developed that the technic is so simple as to bother no one. The possibility of making an error in alignment in soldering the block to the arch is practically nil, and the ad-



Fig. 13.



Fig. 14.

vantage gained is so great that there can be no question that the use of the round wire and the soldered blocks will be accepted as more desirable than the use of the angular wire. Iridio-platinum seats into which the blocks accurately fitted were constructed and soldered to the tooth bands. When the blocks were

soldered to the arch wire and locked into the seats by bending their edges, the attachment between the arch wire and tooth was rigid (Fig. III). The appliance was first published in this



Fig. 15.

form, and much good work was done with it as it was then used, but a serious fault developed. When the seat was made thin enough to bend over and lock the block into place, it was so frail that it often became loose under continued pressure and the

stress of mastication, allowing the block and arch wire to slip, and thus the force was not applied as it should have been. Then began the hunt for a lock that would hold or release the wire as desired. No fewer than sixteen good, bad and worse forms of locking devices were tried and cast aside. Then came the fortunate day when the form now used was designed. It has been in use eight months. More than a hundred dozen have been used, and so far as can be learned, not one has allowed the wire to slip. Never have they failed to release when release was wanted.

The attachment between the tooth and the arch is made by an inter-locking seat (Fig. IVa) and block (Fig. IVb), the former being soldered to the tooth band, and the latter to the arch wire. The seat consists of a flat oblong base and two flat parallel walls rising at right angles to the base. The walls are rounded at the top, and each is pierced near the top with a small hole, the two holes being in alignment. The seat is made of platinum-gold and is .022" thick. The distance between the walls or across the base of the seat is .040".

The block is of platinum-gold, but harder than the seat, and is .040" thick and shaped to fit inside the walls of the seat above described, except that it is .005" greater in elevation than the side walls of the seat, which provides means for its being forced into the seat, with a pair of pliers, when there is stress on the arch wire to which it is soldered. The block (Fig. IVb) is pierced by two holes, the larger runs longitudinally and its bore is equal to the diameter of the arch wire used, or .020". The smaller hole is through the transverse diameter of the block near the top and is in the exact place to be brought into alignment with the two holes in the seat walls when the block is forced into place in the seat. The block is locked into the seat by placing a delicate pin through the seat walls and the block (Fig. IVd). When so locked, no play is possible. The two parts are made to fit to the minutest fraction of an inch, and as they have three flat walls in apposition, and are locked firmly together, they do not permit of any play whatever. The molar and anterior attachments are alike, except that the molars are the longer (Fig. IVc).

It is not to be supposed that the complete technic for all

classes of cases can be given in an essay of this character. A general outline of the technic is all that can be attempted.

The technic of construction is very simple. The tooth bands



Fig. 16.

are first constructed, and to their labial surfaces are soldered the seats (Fig. V). No necessity exists for getting them into alignment with each other, or of getting them at exactly right angles

to the long axes of the teeth. If they be placed somewhere nearly at right angles it will be sufficient. After the bands with the seats attached have been cemented to the teeth, the arch wire is prepared as follows: A piece of arch wire is selected and enough blocks to correspond with the number of tooth bands are threaded on the wire; a molar block being first and last with the anterior blocks between. One of the molar blocks is now soldered to the wire. The block is next introduced into the seat in the mouth and the arch wire is bent in such a way as to bring it to lie through the next seat. If there is to be any change made in the relative position of the molar and the first tooth to be engaged, anterior to it, a loop should be made in the wire in such a position that it will lie near, without touching, the gum, and *then* bring the wire to lie through the next seat. When this has been done, bring forward the next block on the wire until it is approximately in the proper place to go into the seat. Next, with a pair of crimping pliers having a delicate projection in one beak, crimp the block on the wire; now the block may be forced into the seat and if it is not in its proper place on the wire, it can be forced into place by grasping the ends of the seat and block in a pair of pliers and bringing force to bear. As they are exactly the same length, the block must go to its proper place. The arch wire is now removed from the mouth and the block soldered, there being little danger of displacing the block on the wire because after crimping the block, force must be used to change its position on the wire. Each block is, in its turn, brought to its proper place and soldered in a like manner, loops being formed wherever necessary. After the last block has been soldered, any remaining portion of the wire is cut off. It will now be found that when the arch is placed in position each block will lie passively in its seat (Fig. VI).

When the work required of the arch wire has been determined it is bent into the necessary form and is then replaced in the mouth and each block is forced into its corresponding seat and locked there. If an effort is to be made to bring all the teeth into harmony with the line of occlusion with one application of force, measurements of the incisors and cuspids will be made, and by using the Hawley arch-predetermining-transparencies the true arch for the individual case will be determined. Guessing

is eliminated with the diagram of the true arch at hand. The loops in the expansion arch already constructed will be opened, closed or twisted, as may be required, to bring the wire arch to the size and shape of the ideal dental arch determined on, with each block occupying the position in the ideal arch that the labial or buccal side of the tooth should occupy. After this has been done, the arch wire is placed in the mouth and each block in its corresponding seat. If we could depend on a wire developing one hundred per cent of resilience, nothing beyond this would ever be necessary, but that of course we cannot do. It will be observed that the attachment between the tooth and the wire arch is rigid. There is no chance for any play between them. Any force brought to bear through the arch wire must, in time, be registered in the tooth, and, as the attachment is rigid, the tooth must move as a whole, the root as well as the crown. In fact the control over the tooth is absolute. It will be argued that so small a wire will not produce enough force to move the teeth in a mature jaw, or expand an arch. The answer to that argument is that it does not require much force to do anything necessary in moving of teeth, if that force be continuous over a long period of time. The arch is described as a looped spring and the essayist will show you proof that it will continue its pressure over a period of four months without tightening, and that it will expand an arch, and that it will move teeth in an adult jaw, and move them so gently, slowly and steadily as not to produce even the slightest soreness, and that when they *are* so moved they require but a minimum of retention.

Model shown in Fig. VII, of a lady of twenty-eight, who had a cuspid extracted when she was fifteen years of age, allowing the lateral and first bicuspid to come into actual contact with a decided lingual movement of all the superior incisors. The appliance was adjusted on February 10, 1914. It was tightened on March 3, April 7, and May 5. The teeth continued to move until the latter part of June, after which nothing was done until September 8, when certain events in the lady's career made it highly desirable that the appliances be removed. This was done, and a bridge was made by her dentist to supply the missing cuspid. The model shown in Fig. VIII was made on January 12, 1915, more than four months after retention was removed.

The occlusion originally was such that the incisors had been much worn, and when they were placed in their proper places there was no over-bite. The retention period was less than three months, and yet it will be observed that only one tooth, the right central incisor, has shown any movement, and it but the very slightest.

The case was selected for illustration on account of the advanced age of the patient and the difficulty usually attending the retention of such a case at that age.

Fig. IX shows a case of a boy of fourteen. The model was made on June 11, 1914, and the upper appliance adjusted on June 18. The writer's absence from the city followed by the patient's absence prevented even an inspection of the case until October 14. The change was so startling that the appliance was removed and a model was made, which is shown in Fig. X. It will be observed that there has been but little expansion in the molar region, and that there is not enough room for the cuspids, but it will also be observed that *there has been a great amount of movement and that all of the movement of each tooth has been in the desired direction*. Fig. XI shows what the second application of force accomplished.

Fig. XII shows a case of a boy of eleven. The model was made on September 16. The upper appliance was adjusted on September 30. Permission to allow the case to go three months without further attention was asked. Nothing was done until December 16, at which time the model shown in Fig. XIII was made.

The work shown was all done with a platinum-gold wire. Your essayist at a meeting of the American Society of Orthodontists last year said that, if he could get a steel wire with a noble metal sheath so that he could solder it, and could then find a proper means for tempering it, he could finish sixty per cent of Class 1 cases with not more than two applications of force. In answer to his prayer for wire with better resilience, listen to this quotation from the report of Dr. Weston A. Price, chairman of the Research Committee of the National Dental Association:

"Tungsten with its elastic content about twice that of steel, its melting point nearly twice that of platinum, its stiffness about six times that of thirty per cent iridium in platinum and with

the remarkable property that it does not anneal or lose its stiffness and elasticity even when heated to the melting point of gold, makes it particularly adaptable for many parts of orthodontia appliances. After testing tungsten in practical use in expansion arches for about a year, and after extreme laboratory tests, we believe it to be superior for various forms of expansion arch to any metal that we have heretofore found for the following reasons: The required elasticity and rigidity can be secured with smaller sizes. Attachments of any kind may be made to it with pure gold or with any karat of gold solder, without changing its stiffness at the point of attachment. The entire appliance and its connecting parts can be of such metals that not only is there practically no discoloration or oxidation of the appliance, but also with very slight electrolytic potential difference between the various parts, thereby reducing the electrolysis.

This great elasticity of tungsten makes it particularly desirable and adaptable for the new type of expansion arches, a much smaller size of tungsten can be used for this purpose than may be in the other metals and still have a large factor of stiffness for expanding the arch. The attachments can be made with any gold solder without danger of softening or annealing the arch and the bends can later be taken out cold, if not sharp, and if sharp, by heating to a dull red while bending. It does not crystallize and break like gold clasp bar, and similar metals, under the stress of mastication."

With such a wire as Dr. Price describes it is possible, in a large percentage of cases, after drawing a diagram of the ideal arch for each case with the aid of the Hawley arch predetermining transparencies, to construct a wire arch which will, when properly locked to the teeth, bring them into harmony with the line of occlusion without further attention. In another large percentage of cases it will require two applications of force. The first to secure the proper width to arch, before attempting the placing of individual teeth, such as rotation, etc., and the second to secure such placing and rotation. In others it will require more than the two, but your essayist readily believes that there is no case, of suitable age if it is amenable to any treatment, which cannot have the best, that is possible for the case, completed in a half dozen applications of force, and that without pain.

In August, 1914, there was placed in your essayist's hands a piece of Tungsten wire with a gold-palladium surface, such as has been produced by the Research Commission of the National Dental Association. The case shown in Fig. XIV was selected as suitable for a trial of this wire. Very careful and exacting measurements of the teeth were made and the true arch was determined to the best of the operator's ability. The attachments were made and cemented to the teeth. The wire arches were then constructed as described above. These were both attached to the teeth, as given in the technic, on September 2, 1914. The case was seen on the average of once a week, but only for observation, as nothing was done until the appliance was removed on April 9, 1915, at which time the work had developed to the point shown in Figs. XV. and XVI. Your essayist makes no claim that normal occlusion was then secured, but leaves to your own judgment the value of an appliance which will perform the work shown in these two illustrations without attention and without even tooth soreness.

Your essayist wishes it distinctly understood that in ordinary handling of a case, he would not permit it to go as long a period without attention. His object in doing so in this case was to allow the appliance to work to the limit of its ability and in so doing, test the value of the new Tungsten wire.

Let us now see if this appliance has overcome the objections which its creator has raised to the previously existing appliances, and if it has overcome them, let us see if it has developed any new faults. If it has overcome these objections and has not developed a new lot of trouble peculiar to itself, it is worthy of your attention—otherwise, it should be discarded.

To state the difference in the operation and the principles of force employed by the different appliances in a few sentences and bring these differences sharply before you so that there may be no confusion in your minds, let it be said: The older Angle appliance uses a rigid arch formed in the shape of an ideal dental arch and depends on the use of ligatures to bring the teeth to this form. This is supplemented by the ability to lengthen the arch by a screw at either of its ends.

The tube and post alliance uses a semi-rigid arch bent to the form the teeth occupy in mal-occlusion and depends on the force

produced when, at intervals, the arch is removed from the mouth and bent into a shape more nearly approaching the ideal dental arch. This force is supplemented also by the ability to lengthen the arch by a screw at either of its ends and by the use of wedges for rotations.

The appliance presented here depends on a non-rigid arch formed into the shape of the ideal dental arch, which is so flexible as to permit of its being bent into the form of the dental arch, with the teeth in mal-occlusion, and so resilient, by virtue of its composition and the loops into which it is formed, that it will return to its original form of an ideal dental arch and carry the teeth with it. The greatest feature of the appliance is that by virtue of the loops into which the wire is bent, it is capable of exerting force over a long period of time, and is capable of moving a tooth a relatively great distance without being tightened, or at any time exerting more than a very little force.

The objections to the older Angle appliance were: First, to the intermittence of the force developed by the screw. That has undoubtedly been overcome.

The second was to ligatures, there being many reasons why they are objectionable. This appliance uses no ligature. The third was to the fact that the force was developed at a point distant from the one where it was applied, and was not always reliable for that reason. In this appliance the force is developed at the point where it is used.

The fourth was to the inability to lengthen any intermediate section of the arch. That has certainly been overcome. The fifth was to faulty anchorage. In this appliance reciprocal anchorage is carried to the nth degree. The sixth was to the inability to secure bodily movement of teeth. With this appliance there is perfect control over all the teeth.

The seventh was to the constant surveillance and attention which the appliance required. That this appliance needs little of either is quite evident. The eighth was to the necessity of making retaining devices, and the length of time it was necessary to wear them. This appliance is its own best retainer, and the retention period is much reduced.

The objections to the tube and post appliance were:

First, to the severity of the technic necessary. The neces-

sary technic for constructing this appliance is simple and is along lines easy to follow.

The second was to the lack of provision for proper expansion. That has been overcome in this appliance, and with a wire but two-thirds the diameter of the one previously used.

The third was to lack of root control in the molars and bicuspids. This appliance gives control over all the teeth. The fourth was to the lack of ability to rotate teeth without wedges or ligatures. That surely has been overcome.

The fifth was to the abrupt application of force by the screw. That too has been met and overcome. The sixth was to the difficulty of repair. In this appliance any band can be removed and replaced without disturbing any other part of the appliance.

The question now arises: does the appliance as described have any faults, and the answer is yes. The lack of soreness has, strange to say, proved a bad feature, for the reason that when there is no soreness the patient is very apt to put too much strain on so delicate an appliance by biting into apples, hard toast and other substances, and frequent breakage of the arch wire has resulted, but the new tungsten wire has overcome even this.

THE SIGNIFICANCE TO THE DENTIST OF ORAL INFECTIONS IN THEIR RELATION TO SYSTEMIC DISORDERS.*

BY THOMAS L. GILMER, M. D., D. D. S., SCD., CHICAGO.

This paper has not been written with the idea of bringing forward new facts, but with the hope that it might stimulate dentists to increased thought on the relation of focal infections to systemic disorders.

Nothing heretofore has occurred which has had a greater tendency to draw medicine and dentistry closely together, and demonstrate their interdependence, as has the study of focal infections by Hunter, Billings, Rosenow, Davis and others. These men have proven beyond a doubt that jaw infections often supply the primary focus from which secondary lesions in other organs or parts of the body arise.

*Read before the Illinois State Dental Society, May, 1915.

This added scientific knowledge must bring the dental student to a more complete realization of the necessity for a better understanding of the fundamental principles underlying medicine as a basis upon which to build dental education. Disease of the mouth is fundamentally the same as disease in other parts. Most diseases of bacterial origin are due to the pathogenic organisms very generally found in the mouth. Dentists know much of the pathology of the teeth, and of local manifestation of infection immediately connected with these organs, but recent developments show that there is a wide and inviting field for further study along the lines of systemic disorders as a result of mouth infections. The mouth and jaws afford many opportunities for the observation of diseases other than those dependent upon the teeth. Tumors, noma, acute ulcerous gingivitis, Vincent's anigra, tuberculosis, actinomycosis, and many other diseases, besides injuries and deformities of the jaws and face are for the dentist to understand and treat. All of these are as much in the dentist's domain as are the many lesions of the eye in the domain of the ophthalmologist. If this is true, then why should the dentist not be as familiar with mouth pathology as are other specialists with the pathology in their fields? If one knew all of the bacteriology of infections of the mouth, he would know practically all of the bacteriology of infections in general. In the diseased mouth we may find almost every known variety of pathogenic organisms. The mouth and jaws cannot be circumscribed and their relationship cut off from the rest of the body. A focus of infection in the mouth may be insignificant locally, but there is no positive dam at all times which will prevent the bacteria causing it from floating away in the blood and lymph streams to other parts and setting up secondary foci of more or less grave importance, and this is just what does happen. The seemingly innocent periodontal or periapical infection may, and generally does sooner or later, send toxins or seeds of infection to the heart, kidneys, joints, muscles, nerves, and indeed to all parts of the body, causing harmful changes in some one or more places. Chorea, pernicious anemia, arthritis, inflammation of the heart, neuritis, appendicitis, gastritis, gastric ulcers, myositis, iritis, sinusitis, and many other diseases are often directly attributable to mouth infections.

In jaw and mouth infections we find among the pathogenic bacteria, the staphylococcus, the streptococcus, the pneumococcus, the fusiform bacillus, diphtheroid bacilli, the tubercle bacillus, the influenza bacillus, actinomyces, and the micrococcus catarrhalis. Some one of the organisms mentioned, either specifically or after transmutation, may be transferred to other parts producing a variety of lesions in various organs. Even though mouth foci are very often a cause of lesions in other organs, it does not necessarily follow that the diseases before enumerated are always traceable to the mouth and jaw. A diseased prostate, fallopian tube, gall bladder, tonsil or some other organ may supply the primary focus. Vicious cycles may be established by jaw infections. A jaw abscess may be the primary focus, secondarily the tonsil, the muscles, joints or heart. From these the bacteria may be sent back to the jaws, causing another focus of infection in them. No one is safe who has an infection in the jaw, be it ever so small, since there are plenty of bacteria in the smallest apical abscess or pyorrhea pocket to cause a serious lesion in some other part of the body.

I could cite case after case of lesions generally termed rheumatism, and other infections, which have come under my observation, and many more from the practice of others with whom I am working, which were definitely traceable to the jaws, and when the primary infection in the jaw was removed, the secondary symptoms disappeared. Very recently a Chicago man over seventy years of age went to California for a pleasure trip. While there he had an attack of rheumatism in one foot and ankle. He was unable to walk except with the aid of crutches. He returned to Chicago and I found he had two infected teeth, which were too badly diseased to be restored to health. I removed these teeth on Monday and on the following Saturday he walked without the aid of either crutches or cane. He returned to California and resumed a motor trip which had been broken off by his indisposition. If it were not that I had seen other somewhat similar cases, I should have thought this rapid recovery a coincidence, since usually much more time is necessary after the eradication of the primary focus before one gets the full benefit from such treatment. Such brilliant results are not attained except in acute cases.

The incredulity of some dentists and physicians relative to mouth and jaw infection being a primary cause of disease manifested secondarily in more or less remote parts, is not surprising, since they are aware of the fact that few mouths of adults are free from some focus of infection, and that the majority of these individuals seemingly enjoy good health; therefore, they conclude from this that wrong deductions must have been arrived at.

To answer questions based on this assumption, one may ask other questions. For instance, why is noma or Vincent's angina so seldom seen when the bacillus fusiformis is so universally found in the mouth? Why is pneumonia not more common when the pneumococcus and other bacteria which cause it are universally in the mouth? Why will one child in a family of several have whooping cough or scarlet fever and another similarly exposed escape it? Is it not a fact that those who are generally classed as well have at times flitting pains, slight gastric disturbances, headaches or other transient indispositions? May not these mouth infections, at times, be the cause of some of these conditions? One may receive from mouth infection, doses of toxins, or bacteria, only sufficient to produce these slight disturbances, and have these only when the body tissue resistance is lowered by worry or exhaustion. Again the virulence of bacteria varies at times. A staphylococcus at one time may be able to produce only an insignificant pustule on the skin, at another time a malignant carbuncle. I saw a patient recently who died from an infection of the mouth caused by this same staphylococcus, but of the virulent type. Guinea pigs injected with staphylococcus from this case were made sick and died. Autopsy on these animals showed small abscesses in many organs of the body, and the same staphylococcus was recovered from these lesions. In this case we were dealing apparently with the same bacteria usually found in the skin pustule, but for some reason in the one instance, there was high virulence, in the other, low virulence. It is believed that symbiosis exerts a great part in some infections. At one time the proper symbion may not be present or the conditions may not be favorable for symbiotic action. These are conditions which may play an important part in the degree of intoxication from bacterial invasion.

Susceptibility and immunity vary in the same individual at different times or in different individuals at the same time. This is also an important element in the possibility of or the degree of intoxication.

Rosenow in his great work on transmutation of certain bacteria found by varying the oxygen tension, that he could change one type of streptococcus into another type. He was also able to change a streptococcus into a pneumococcus. In these changes the organisms become selective with predilection for certain organs or parts. These important discoveries must be considered in our study of infections. In Moody's and my own study of the bacteriology of alveolar abscess we found that the predominating bacteria in acute abscesses of the jaw was the homolitic streptococcus, while in the chronic form the viridans prevailed. Rosenow's discoveries may account for this change. In the acute alveolar abscess oxygen is plentifully supplied from the blood. In the chronic form the blood supply is materially lessened by the connective tissue protective wall which surrounds the suppurative area. While this wall is not a complete barrier to migration of bacteria and diffusion of their toxins, it does lessen the blood supply in chronic abscess, thereby lessening the oxygen tension, therefore probably the change from the homolitic into the viridans form of streptococcus. The streptococcus viridans escaping from the isolated area at the end of an infected tooth's root may be carried by the blood stream to the heart and an endocarditis may result, or they may find lodgment in some other part causing a lesion there.

Since dentists now know that primary mouth foci of infections may sooner or later cause secondary manifestation and often do in other parts, of more or less grave significance, what will their attitude be toward the subject? Will they continue the retention of loose incurable pyorrhea affected teeth in the jaws? Will they continue to use badly infected roots as piers for bridges? Will they ruthlessly destroy pulps in good sound teeth that bridges may be inserted, knowing that many roots cannot be perfectly filled? Will they ignore the dangers from incurable abscessed teeth and retain them indefinitely in the jaws? Will they continue to make and set bridges which are unsanitary?

I am not unmindful of the fact that a few dentists may become fadists and go too far in sacrificing teeth. It does not necessarily follow that all teeth must be removed which are abscessed, but I do insist that unless diseased teeth may be restored to health, either by medicaments or by surgical procedure, they cannot safely be retained in the jaws. No one would permit an infection in one of the bones of the arm to continue indefinitely. If not, why should he be willing to tolerate infection in the jaws?

The dentist's responsibility is tremendous in the light of present knowledge, and unless he changes his methods for the better he will be considered criminal. I do not wish to be classed as an alarmist, but rather to counsel dentists to a deeper study and a more careful and intelligent performance of their work, that less harm and more good may be done for mankind.

A REVIEW OF THE RELATIONS OF ORAL ENDAMEBAE TO PYORRHEA AND OF THE USE OF EMETIN IN THE TREATMENT OF AMEBIC PYORRHEA.*

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The writers present the following review for publication with considerable hesitation. Their views have been widely circulated in original form and in abstract, and little that is new can be added at this time by them, further active study along desirable lines being for both for the immediate present prevented by required occupation with either class instruction or the demands of practice. Its presentation is, however, in compliance with the request of the officers of this association, and is made with cordial appreciation on the part of the writers of the honor attending such an invitation.

The study which has led to our conclusion that oral

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endamebae are of etiologic importance in a large class of pyorrhea lesions was originally projected with a view of verifying and systematizing the observations of a number of earlier investigators concerning various protozoa described by them as parasites of the human mouth. Comparatively little attention has been paid to the work of the earlier observers, as of Gros¹ (1849), Steinberg² (1862) and Grassi³ (1879); and even the more recent studies, as those of Flexner⁴ (1892), Kartulis⁵ (1893), Prowazek⁶ (1904) and Verdun and Bruyant⁷ (1907), were more or less neglected because of an impression that the organisms dealt with were of no pathogenic interest, and perhaps were of but rare occurrence. Realizing this insufficiency of consideration it was deemed wise, therefore, to give particular attention to the relations of parasitism to coexisting pathological lesions; for which reason primarily the studies were made upon a class of individuals, patients in the insane department of the Philadelphia Hospital, among whom pyorrhea was known to be quite common and frequently of high grade. While other forms of protozoa were encountered in these studies and, it is realized, should eventually be followed up as originally intended, the marked uniformity of endamebic presence in the first series of 46 cases of pyorrhea examined by us immediately arrested and monopolized our attention. It was difficult to meet with proper cases for control observation. Of ten selected for such purpose, three were on second and close examination excluded, because of the discovery of small interdental suppurative lesions. The remaining seven were carefully examined for the presence of amebae, but none were discovered. The excluded three were found infested and are included among the forty-six of the original report. Since that preliminary report⁸, besides many which in one way or another have escaped record, we have records of examination of more than two hundred cases of pyorrhea, of which 97 per cent or more were found by microscopic examination to harbor amebae in the pus of the pyorrhea pockets; and there are records of 23 mouths without lesion and free from amebae on examination, which may be added to the seven original controls (this failing to take account again of a number of scattered controls the record of which was inadvertently neglected). This uniformity in our first group of cases of the presence of amebae suggested naturally that

by suitable methods of study some other relation than mere chance might be found to exist; and, unable to proceed in the usual and approved methods of determination of pathogenicity because of the impossibility (existing even today) of cultivating and isolating pure cultures of these organisms for use in inoculation experiments, the writers had recourse to the use of emetin, a proved amebicide, with but feeble bactericidal properties, for the purpose of destroying these parasites and observing the resultant influence upon the lesions themselves. The application of emetin hydrochlorid locally to the suppurative lesions, as is well known, has proved of remarkable value, being soon followed by cessation of suppuration and by the disappearance coincidentally of the endamebae. In further work along these lines, but upon patients presenting various systemic complications, the disappearance or marked amelioration of such complications as arthritis, erythrocytic anemia, neuralgias of various types, gastro-intestinal disturbances, etc., indicated to our minds quite clearly some relationship between these more distant faults and the oral condition (Hunter's oral sepsis). And from these two basic data, of the importance of oral endamebae among a large group of associated vegetable and some animal micro-organisms in the lesions of pyorrhea, and of the dependence in some greater or less degree of widely distributed and very varying systemic complications upon the oral fault, the writers have felt that the most reasonable and satisfactory working theory (to be modified as future knowledge may require) must run somewhat as follows: The amebae, obtained in unknown way from an unknown source (but probably one in which they were parasites) into the human mouth may live in the protected positions, as along the gingival trough and in the interdental spaces, in the midst of the usual collections at such sites of food detritus, salivary moisture and bacteria, and may perhaps when in large numbers be able directly to give rise here to suppurative lesions. However, they readily along with their associates find their way into any solution of continuity between the gum and the teeth, however such break may be brought about, and find such recess a very favorable habitat. Lodged in such a site and multiplying there they induce a reactive inflammation attended by local destruction of tissue, by fluid and cellular exudation and by connective tissue proliferation at the borders of the lesion. The amebae are possessed of high proteolytic ability, ingesting and digesting

erythrocytes, leucocytes, and perhaps also fixed tissue corpuscles. In the course of this destruction of proteins they doubtless produce substances of relatively simple nitrogenous composition especially suited to the nutrition of their vegetable associates, and in consequence in this manner favor the luxuriant development of the various bacteria and leptothrix threads which are so commonly met along with the amebae. In part, however, they ingest and destroy these bacteria; any good preparation of ameba-bearing material stained with Giemsa's stain being sure to show numerous bacteria and bacterial granules within the amebic bodies. In the disintegration of the bacteria there are sure to be set free various endotoxins, varying in quality with the particular type of organism concerned, and in quantity with the number undergoing destruction. Whether the amebae are concerned in toxin production is unknown and is probably not a matter of great proportionate importance; these endotoxins and the exotoxins of the whole group of living bacteria being sufficient, in all probability, to account for the intoxication symptoms met as complications of pyorrhea. The differences of these toxins, depending upon the type of bacteria predominating in this or that subject, can be appealed to in accounting for the different manifestations of these complications, in one case being predominantly concerned in production of synovial inflammations in different subjects, in another in causing a hemolytic anemia, in another perhaps causing some structural degeneration of the kidney or other parenchyma. The uncertainty of occurrence of complications and their variation in different individuals argues against a uniform source, that is from the amebae themselves; but at the same time it must be realized that factors of drainage and of ease of absorption (involving the density of the wall of the pocket and the grade of hemic and lymphatic circulation in the wall) are also to be taken into consideration in this same connection.

With this conception of amebic pyorrhea, the affection naturally falls into a dual role, one, the local manifestation, being of especial importance to the dental profession, and the second, that due to diffusion and the systemic effects of various toxic materials from the local focus, being of decided importance to the general practitioner of medicine. Moreover, while the endamebae unquestionably most frequently find their habitat about the teeth, it has been

shown that they are not confined to this situation, but may parasitize neighboring or anatomically related situations, where in an analogous mode they may produce comparable pathologic results. The writers with Middleton⁹ have shown their presence in the crypts of the tonsils, usually in chronic cryptal tonsillitis; they have been met in the pus from the frontal sinus (unpublished case of Ivy) and from the lateral sinuses (unpublished case of Cryer), in the pus of middle ear suppuration (unpublished case of Ersner). One may very properly believe that with further studies they will likewise be found in the pus from mastoidal lesions; and it is well known that amebae, thus far invariably interpreted as aberrant dysenteric amebae, have been found in the contents and walls of abscesses of the brain.

Leaving at this time all these established and provisioned relations, however, for fuller consideration of the local disturbance which is of particular interest to the dentist, the writers are anxious to indicate their belief that not all cases of peridental suppuration are amebic, however high the proportion of the latter type seemingly reaches. There is no reason, to our minds, to erect a special group due to mechanical influences. Mechanical influences undoubtedly play an important role in the primary establishment of focal lesions through which amebae and other micro-organisms then penetrate into the gums, and may occasionally, in any case, influence the maintenance and progression of the lesion; but to us this is but an adjuvant role favoring in varying degree and at varying time the important etiological agencies, the living micro-organisms. Improper use of toothpicks, of dental floss, harsh use of too hard a tooth brush, the impact upon the gum of a ledge of salivary calculus in forced dental approximation, the similar effect of too deep a bite into a firm apple or food of similar density, the accident of penetration of the gum by a fish bone or by a bristle from a tooth brush, the fault of an ill-fitting piece of mechanism in the mouth, these and similar features are real enough; but to us they are effective particularly in that they produce separations of the gums from the teeth or crypts in the gums to which micro-organisms may more or less readily gain access and in which they may be harbored. The inconstancy of formation of hard tartar along the tooth root in a pyorrhea pocket is itself an argument against this as an essential factor in loosening the pericemental tissue. That it mechanically

accomplishes this when the tooth is forced downward in its socket in firm occlusion is doubtless true, and in this sense it is an accessory factor of some importance; but to us it is rather a secondary complication and would not exist were it not for the preceding purulent infection. (This does not apply directly to the deep nodular serumal concretions, but where they are concerned an analogous argument is applicable.)

The old, relatively hopeless attitude of the profession toward pyorrhea because of the not infrequent discovery of some co-existing serious bodily disease is likewise to be amended, if the writers are correct in their position. The coexistence of diabetes mellitus, of Bright's disease, of severe grades of anemia, etc., has been very commonly interpreted in the sense that such affections underlie and are in some important degree causative of the periodontal suppuration; and in consequence the terms diabetic pyorrhea, cachectic or anemic pyorrhea, nephritic pyorrhea, etc., have arisen, unduly confusing the subject. We cannot deny that many of these corporeal faults do exert an influence upon the oral condition, that in consequence of them the efficiency of bodily antagonism to invading micro-organisms is deteriorated, and for this reason the local infections are permitted to develop with less opposition; but aside from this, if we are correct, it is more logical to believe that often the pyorrhea is causal of the coincident disease, and that at most the etiologic significance of the corporeal affection for the pyorrhea is an indirect one. We would accept the idea that instead of rheumatoid arthritis being productive of pyorrhea, it is itself the result of intoxication from absorption from the pyorrhea pockets; that chronic Bright's disease may actually be induced by the poisons from the periodontal foci whatever the influence the nephritis may have had upon the pyorrhea. Unquestionably diabetes mellitus, by its increase of oral sugar and by its known lowering of the complemental factor of the immune body, favors a luxuriant growth in the mouth, as elsewhere seen in other infectious complications of the disease; but diabetes may be quite free from pyorrhea, and in diabetes there will be no pyorrhea if infection of the gums be prevented, and moreover appropriate dealing with the local infection will cure pyorrhea irrespective of the coincidence of diabetes.

Essentially, then, we are persuaded that pyorrhea is to be

looked upon and dealt with as a primarily local infection; and the wisest classification, we believe, will be based upon the character of that infection. We have for this reason proposed the term *amebic pyorrhea* for a large group of cases in the pus of whose gingival and alveolar pockets certain endamebae are to be found in numbers and relations justifying the belief of their pathogenic importance in the sense above outlined. But at no time have we felt justified in denying the occurrence from time to time of cases of periodontal suppuration in which the dominant microbic factor is other than those amebae. There is no reason why one may not in some given case fail to find amebae, but rather an overwhelming presence of pneumococci, staphylococci, micrococcus viridans, or of some form of the spirochaetes, and would not in such cases expect the same happy results from the use of emetin as in the amebic type of case. We have encountered three cases of such *spirochaetal pyorrhea*, and in the third found a quick and successful result from the use of neosalvarsan powdered in the lesions. Doubtless the best use of vaccins will be found in cases of purely or relatively purely *bacterial pyorrhea*. The analogy to dysentery should, until disproved, be kept closely in mind. Dysentery, with its common symptom of bloody flux, is not one single disease entity. A certain large group, known as *bacillary dysentery*, is widely met in temperate as well as tropical climates, and is caused by some strain of Shiga's *bacillus dysenteriae*; but there is also an important class of cases, met mainly in tropical distribution, in which in the colonic lesions and in the dejecta certain parasitic amebae are found, these cases constituting the group of *amebic dysenteries*. The actual relation of the amebae in these dysenteries is not one whit more certainly determined than is that of the oral endamebae to pyorrhea. They are held to be pathogenic because of their discovery in the ulcers of the large bowel and because of the disappearance of the symptoms of the disease when these parasites are destroyed by emetin or some other amebicide. Inoculation experiments are made, not with pure cultures of the dysenteric amebae (it is widely held that as yet no true parasitic ameba has been cultivated either in pure or mixed growth), but with the fecal matter of dysenteric cases, this containing myriads of bacteria as well as the amebae; and the medical profession is not sure whether the amebae themselves are the real cause of the dysentery or are merely conveyors

of bacteria into the tissue of the bowel wall and the latter the really important factor of infection. Emetin, however, kills the *endameba histolytica* and cures this type of dysentery, and it does not influence bacillary dysentery; and the medical profession as a body, whatever the quarrel as to the details of etiology, agree in calling this form of the affection amebic dysentery. And there are in addition other protozoal forms of dysentery, as that due to balantidia and that of malaria; there are varieties regarded as verminous; and there are toxic forms, as that met in uremia. In the case of pyorrhea it is not amiss to look for an analogous classification as the most profitable one for general service; and to relegate the local traumatic influences and the complicating bodily affections to a secondary, often merely predisposing or aggravating status.

It is in this sense that the writers have proposed the term "amebic pyorrhea," a group which, whatever modification may be necessary in the future from wider study at home and in other districts of the world, would seem from our own studies and those of others in the United States, to include more than 90 per cent of all cases of pyorrhea. In the remaining group we are confident of a small proportion of spirochaetal pyorrheas, as above referred to, and with equal confidence look forward to the demonstration of scattered examples of different kinds of purely bacterial types. Whether there be also other protozoal forms and toxic forms must await further study. Confirmation of the claim that almost uniformly endamebae are discoverable in the pus of pyorrhea pockets has been ample; but, following the old belief that these organisms are of no pathogenic importance, the assertion is frequently made that amebae are to be found in normal mouths. This statement in reality is of little or no argumentative force. Were it true, we might answer that these parasites must, of course, have originally come from some source outside the individual subject; they cannot at the beginning produce definite pockets of suppuration and their presence may be indicative of this early invasive stage. Dysenteric amebae are found in the stools of nondysenteric subjects frequently; pneumococci and diphtheria bacilli are not uncommon in the mouths and the former even in the lungs of healthy individuals; pus cocci are practically constant in the skin of persons who have no suppurating lesions. But further, some of the persons making the above assertions are not skilled dentists; and we hold that none

but a trained and careful dentist is likely to give a competent opinion as to the normality of border-line mouths in the course of ordinary examination. A trifling suppurative lesion in the gingival groove or in the interdental spaces may be easily overlooked, and yet be the point from which amebae free on the teeth or general oral surface have come. Until competent authority finally determines this point to the contrary, we prefer to accept the evidence of our own controls, that is, that endamebae are not found in purely normal mouths. Even if this be found incorrect, there remains the first position as an unassailable explanation.

In a paper read by us before the American Society of Bacteriologists at the last Christmas convocation of the American Association for the Advancement of Sciences, (American Journal of Parasitology—June, 1915,), a comparative consideration was given the various publications dealing with the recognition of amebic parasites of the human mouth, in which the conclusions reached would recognize two types of these oral endamebae. We are certainly familiar with but one of these, an organism now commonly spoken of as *endameba buccalis* Prowazek, but really originally described by Gros in 1847 under the name *amebea gingivalis*. By our current rules of zoological nomenclature it should be known as *endameba gingivalis* (Gros), with the following names given by subsequent observers as synonyms: *Amiba buccalis* Steinberg, *ameba dentalis* Grassi, *entameba kartulisi* Döflein, *entameba maxillaris* Kartulis, *entameba buccalis* Prowazek. It is a fairly active ameba, with an average diameter of grown examples of 30 or 35 micromillimeters; its pseudopods few and usually lobose to digitate in shape; with complete hyaline ectosarc; and a granular endosarc usually containing bacteria and globular and granular detritus of leucocytes, red blood cells and perhaps fixed cells; with a small nucleus, invisible in the unstained specimen, relatively achromatic and containing a small, dot-like "binnenkörper." Morphologically it is very close to *endameba histolytica* Schaudinn, and the writers cannot accept Prowazek's points of differentiation; but is probably different from the latter physiologically and in pathogenesis, and as a rule it is smaller in size. The second species, which we have not as yet recognized in our studies of pyorrheal pus, is *endameba pyogenes* Verdun and Bruyant, an ameba of about the same size and general characteristics as *endameba gingivalis*.

(Gros), but readily distinguishable from it by the large nucleus containing a large, deeply chromatic "binnen-körper." It is not known except from the descriptions by Verdun and Bruyant, but it may well be the same organism as described by Ribbert¹⁰ in the parotid gland, and by the same writer, by Jessioneck and Kiolemengolou¹¹, and by Smith and Weidman¹² in the kidneys, liver and lungs of still-born fetuses and infants.

For the recognition of these parasites for clinical purposes it is sufficient to diffuse a bit of the pus taken from a pyorrhea pocket in a small drop of faintly warmed (body temperature and below) normal salt solution on a slide which has been slightly warmed, and apply a cover glass; and then to search with the microscope (using a power of three or four hundred diameters) for these motile cells. Or one may make directly a thin spread upon a slide; fix with heat, stain with carbol-fuchsin and Loeffler's methylene blue solution; and examine at any convenient time. For purpose of study of the parasites it is best to make spreads with the pus withdrawn on the scaler upon a cover glass; drop it while moist into corrosive sublimate alcohol for at least ten minutes; and, after removing the mercury in Gram's solution and the idoin of the latter by alcohol, to stain by Giemsa's method and by one of the iron-hematoxylin methods. The latter staining is by far the best for nuclear studies; the Giemsa method is valuable for the general cell and its ingested matters, but is not of clear differentiating value for the nucleus.

It is not good advice to propose that by a therapeutic test with emetin the amebic character of a given case be determined. While we believe this is an actual possibility, provided the treatment is properly applied, it is premature in our present state of uncertainty; and the opposite is the advisable and logical procedure; that is, to carefully examine the pocket contents microscopically and to use with confidence the emetin treatment only when amebae are demonstrated therein. There are three ways by which emetin may be administered in these cases: By local application of solution of the hydrochlorid into the suppurating pockets; by systemic administration by hypodermic injection; and by systemic administration by route of the alimentary canal. Theoretically, the remedy should be curative in all three, and doubtless more or less success may be attained by any one of these modes. But in practice, if the experi-

ence we have had is as reliable as we believe it to be, the local use of the drug is much the most effective and should generally be followed. Alimentary administration of emetin pellets, coated with salol or keratin so as to prevent their solution until the stomach is passed, is extremely uncertain. The drug is now and again set free in the stomach and vomiting is induced, with loss of the dose; in other cases the coating of the pellet is never removed and the entire dose is passed per rectum. Even if a better mode of alimentary administration be attainable than by these coated pellets, there seems to be some uncertainty as to the completeness of absorption of the remedy; and there is also to be considered the matter of dilution of the drug and the extreme diminution of the amount actually reaching the parasites in the periodontal pockets. There is an objection to hypodermic administration in the fact that it frequently causes an unpleasant persistent soreness at site of injection. This is no more than that which could be occasioned in hypodermic administration of quinine; and it can, in part at least, be avoided by injecting deeply, intramuscularly. The same objection on the ground of the extreme subdivision of the dose in the general body so that but little can be hoped to be brought in contact with the amebae in the pyorrhea pockets is in force here, too. Even with this diminution of the effective dosage, however, in many cases the amebae are killed and the suppuration stops; but in uncomplicated pyorrhea there is really no special indication for this diffusion of the drug, and in a sense it is a spendthrift mode of using the remedy. Further, if there really are serious and pathological toxic effects to be feared from over-use of emetin, which we have not thus far met in our own work, they are surely more likely to be produced by this than by either of the other two modes of administration. We believe, however, that these objections all fall where there is reason for us to believe that a case of amebic pyorrhea is complicated by the presence of amebae in other locations than the periodontal tissues where it is difficult or impossible to make efficient local applications, as in the tonsils, in some of the sinuses or in the middle ear. Here, just as in amebic dysentery, recourse must be had to hypodermic administration or alimentary dosage, either alone or in combination with local oral applications.

In the recommended direct application of the remedy, too,

there are certain precautions to be observed. The remedy is best applied, not by forcing the needle down into the tissue of the wall of the pocket, as we first believed, but by merely introducing a blunt needle of the syringe into the pocket down to the full depth of the latter, and filling the pocket with the solution, sweeping the needle about so as to reach any special recess. There is mechanical injury done when the wall is penetrated, and to this must be added the local irritant effects of the drug which is diffused into the tissue. Moreover, in forcing a pointed needle into the tissue micro-organisms and toxic matter are carried deeper and augment the local effects, and by their better chance of generalization may the more easily lead to systemic effects. The bulk of the amebae of the lesion are rather in the pus contained in the cavity than in the wall; the few in the latter position are easily reached by the drug as the solution is absorbed and the many within the pocket are, of course, directly reached by the emetin in the pocket cavity. Failure to meet this point of precaution is largely responsible for the severe inflammatory after-results met now and again in the reports of those employing the remedy. In the same general line should be mentioned the fact that in the strength ordinarily used the emetin hydrochlorid solution is at times found productive of more or less inflammation in the mucous membrane of the lips or of the general gingival and adjacent oral surfaces by mere contact. This is undoubtedly exceptional; and it may be largely avoided by using a more dilute solution or by lightly anointing these surfaces with vaseline before introducing the remedy. Caution should be observed, too, to prevent the patient swallowing any amount of the drug which would be capable of inducing nausea and vomiting. This is best met by limiting carefully the total quantity used in treatment of all the different pockets in the given mouth, and by urging the patient to avoid swallowing as much as possible for a time after the drug has been introduced. A third caution should be urged, that the operator see that the solution of emetin used has not deteriorated and is really standard. It is best to make up fresh solution for each patient, as by dissolving a hypodermic tablet of one-sixth grain in about two cubic centimeters of sterile normal saline solution or distilled water (making a solution roughly of one-half per cent. strength). Old solutions are likely to have become contaminated by bacteria which in time cause

disintegration of the emetin; and it is likely that some of the failures with which the treatment has been charged might well be assigned to such a fault of the material used.

Finally, it is to be advised that in the handling of the case no undue mechanical harm be done by such procedures as rocking loosened teeth or by pressure over the pockets to drive out the pus. A certain amount of tissue injury is thus done which is not necessary. The pockets may be flushed out with salt solution in order to better prepare them for the reception of the emetin, and this is a more efficient method of cleansing than by pressure. For the time quiet is of particular value to the inflamed parts; for which reason, too, we would prefer to postpone scaling away any tartar until the loose tooth has become more firm and to do it with as much gentleness as possible and only little by little, from day to day.

With such precautions observed, the writers advocate the direct introduction of a one-half per cent. solution of emetin hydrochlorid into each pus pocket in the mouth, using for the purpose an ordinary dental hypodermic syringe with a flexible blunt needle. In addition to filling the definite pockets, a small amount of the solution may well be run along the dental groove and into the interdental spaces, and about any fixed appliances, in order to reach amebae which may have collected in such positions; and for the maximum total amount for a single treatment for an individual we are in the habit of limiting ourselves to one-sixth grain of the drug. If possible, less should be used; and always the rule should be to use as little as may be allowed in order to avoid the chance of swallowing enough to cause an unpleasant nausea. Such treatment should be repeated daily for five or six days, to be followed by similar treatments every other day for as many times; and if there be no special objection, it cannot be a bad practice to use also one or two hypodermic injections of one-fourth to one-half grain of the remedy at the close of the local treatment in order to reach parasites which possibly may be present in other positions, as in the tonsils. If the case has been properly selected, loose teeth should be appreciably tightened after the first two or three treatments, after which the gentle scaling procedure may be instituted as above suggested, continuing from day to day, so that the end of the treatment will find this step also finished. Within the first

two or three applications, too, the suppuration usually is stopped, the gums lose their soft texture and angry flush, and the patient, as a rule, subjectively realizes a decided improvement. The amebae disappear rapidly and are rarely found in the lesions after the second or third application.

As a rule, no further treatment is needed. But there are cases in which the pus continues, although in diminished amount—this with the amebae gone, but with persistence of some, at least, of vegetable micro-organisms. In such instances, doubtless auto-vaccine would find a particular value to complete the cure; and the writers have used with benefit local application of a salt solution of iodine introduced into the pockets in the same way as was the emetin in the earlier stages of the treatment.

Little at this time can be said as to the extent to which regeneration can take place after the suppurative process is stopped. There is doubtless a marked organization of the cellular infiltrate, and the resultant fibrous tissue is mainly responsible for the fixation of the teeth which is observed. But we personally have no data upon the reformation of osseous tissue which had been destroyed, and we know that the retracted gums do not grow to any extent over the exposed root. Recurrence is not improbable, but is not necessary. It is likely that the persistence of the irregularities of the gums, affording, as they must, special depressions into which newly infesting amebae may easily penetrate, predisposes to reinfestation; but should this occur, a second treatment should be as effective as the first. Several of our original cases, treated in June, 1914, have upon recent examination been found without evidence of renewal of the condition; but one or two others of the group were found with amebae and with at least a slight pus development. Until the source of these organisms is appreciated entirely, satisfactory prophylactic advice should not be expected, beyond that directed to general cleanliness of the mouth. We believe that mouth washes containing emetin or ipecac, or some other amebicide as quinine, thymol or chaparro amargosa are not without value, but the uncertainty of penetration to every niche and corner where the parasites may be situated, in the ordinary use of these washes makes their importance in any given case a matter of doubt.

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DISCUSSION OF THE PAPER BY DR. COLTRIN, "A GENERAL CONSIDERATION OF REMOVABLE PARTIAL DENTURES."

G. WALTER DITTMAR, Chicago.

Mr. President and Members of the Illinois State Dental Society:

Dr. Coltrin has presented a masterly essay. It is well written, comprehensive, and teeming with valuable suggestions that are thoroughly practical. There is little that I can add to what he has said.

However, there are a few thoughts that I will present which may emphasize some of the salient points in the paper. The central thought as expressed in the essay is the "conservation of the remaining natural teeth." Appliances should be so constructed that their outline—form, and method of retention will do the least possible injury to the remaining natural teeth.

The outline should keep away as far as possible from all the teeth except those to which anchorage is made or those which must necessarily proximate the artificial span.

The retentive appliance should be selected with care—whether it be some form of clasp or commercial attachment, the fundamental thoughts governing the selection should be: 1st, that it will cause the least amount of injury to the natural teeth to which attachment is made, and 2nd, that it will be an efficient means of retention.

What the essayist said regarding impressions I most thoroughly agree with—this *most important* operation is very often poorly done, and with a faulty impression results cannot be good.

In addition to the methods described by the essayist I will offer the following technique which was given to me by Dr. J. H. Prothero.

This method is indicated for the class of cases where teeth

are decidedly bell shaped and especially where the teeth proximating the edentulous space lean toward each other.

The impression tray is made from a brass door hinge, about one and a half to two inches square. A right angle bend is made in each of the plates (through which the screws are to go when used as a hinge) which bends run parallel with the joint of the hinge, this gives when the hinge is opened a flat bottom and two sides or flanges. Suppose you wished to take an impression from the lower first bicuspid to the third molar, for a removable bridge, and there was a material converging of these teeth on which you wished to use wire clasp attachments.—1st—fit a piece of card board or thin metal plate between the teeth extending it nicely along the crest of the alveolar ridge. Fit the ends of this strip so that it will remain in its proper position when the impression is taken. Now fill the hinge impression tray with impression plaster and place to position so that you will obtain a good impression of the proximating teeth and alveolar ridge. The card board which is wide enough to reach from the crest of the alveolar ridge to the occlusal surfaces of the teeth will act as a separating media and insure a line of cleavage through the plaster after it is well crystallized.

To remove the impression open the hinge tray, using the necessary force to fracture the plaster not fully divided by the card board; this will allow approximately one-half of the impression to swing buccally and the other half lingually. After removal close the parts to their proper positions and then proceed to make the cast as described by the essayist, using Roach's "Modelite" or cement for the teeth to which clasps are to be formed.

This method of taking impressions does not permit of compressing the submucous tissues as does the modeling compound method, but for a certain class of cases where the submucous tissues are thin and quite uniformly tense a good plaster impression is to my mind the best, and is certainly much easier to obtain than a sectional modeling compound impression.

The essayist has described with excellent detail the indications for and methods of constructing the several forms of the Roach wire clasps. Dr. Roach has developed a nice technique for the construction of these simple and effective clasps. I only

wish to throw out these words of caution—always use high grade clasp wire—anneal thoroughly—and use only round nosed pliers when making decided bends; better invest when soldering and use 18K solder.

Of the various commercial attachments the one which to my mind produces the least strain upon the anchor teeth is the ball and tube form of the Roach attachment. Modified, as indicated in this paper, this attachment forms a most effective means of retaining partial removable dentures where attachment is made to one end of the removable appliance only, as to the distal of cuspid or bicuspid crowns or inlays, where all teeth distally are to be replaced. Modified with an upright clasp metal bar to cause contact near the incisal or occlusal portion of the tooth to which anchorage is made—as is indicated in the illustration,—is the only proper way to use this attachment, without which it is worthless for this class of cases.

There is a great deal more valuable material in the paper that could be discussed, but it is only fair that I leave something for those who are to follow me. I again desire to express my personal appreciation to Dr. Coltrin, for his excellent paper.

DR. H. H. HAYES, Chicago:

I find the ideas set forth in Dr. Coltrin's paper are in accord with my own and for this reason it is hard to look at it from an unbiased standpoint. Some of us are inclined to go somewhat to the extreme with a pet hobby and I believe that it behooves us to exercise careful judgment. As a rule the conservative dentist is usually the one who is the most successful, in the long run.

The whole proposition in my opinion reverts back to the skill and judgment of the operator. The question also, when to use removable and when to use fixed appliances should receive careful consideration.

It is obvious that without a correct impression we can not bring our work to a successful conclusion. I think the use of plaster is generally indicated though many times a combination of two or more impression materials can be used to advantage. This is in cases of undercuts where cores of modeling compound may be made and a plaster impression of the whole may be taken. In using modeling compound on cores of the same material the

heat of the larger portion is almost certain to distort the smaller piece, this would not be the case where combination of the two is used.

Too much cannot be said about protecting the gingivae, this applies to fixed as well as to removable appliances. The want of this has been the cause of much trouble in the past and perhaps has been responsible for not a few failures.

As to the various attachments, all have their peculiar advantages under certain conditions and here again the good judgment of the operator is needed in their selection. In my opinion the Roach and the Gilmore are the most popular of the patented attachments.

The dentist is often compelled to choose between the lesser of two evils and the thought of simplicity should be one of the guide posts in enabling the operator to make his decision.

DR. HART J. GOSLEE, Chicago:

I am very glad to have the opportunity of saying a few words in the discussion of this most practical paper. I want to congratulate the essayist and Dr. Roach on the splendid work they have been doing recently along the lines of removable bridge construction. I had occasion to say before the Chicago Dental Society not long since that I thought it was time a more general discussion of this particular phase of mechanical work should be entered into than has been the case in the past few years, for the reason that I do not know of another line in practical dentistry which demands the same amount of mechanical ingenuity which is required in partial denture construction; nor do I know of another line that offers as great possibilities as are afforded in this particular line of work.

The essayist called attention to the great amount of injury that has been caused to the remaining natural teeth as the result of wearing of partial dentures as ordinarily constructed. This is a very important matter. Let us take these two illustrations here, almost every one of you can recall cases where that type of construction or appliance has caused the ultimate loss of these teeth. Any procedure which will enable us to avoid contact with the crowns of natural teeth, and yet not lose any of the strength of the fixture will aid us in obtaining a greater longevity of the remaining natural teeth. The type of construction advo-

cated by the essayist and designated as palatal bars and lingual bars gives us every possible support and degree of firmness to be obtained by the ordinary type of construction without the injurious effects which come from contact with natural teeth. The essayist said it was probable that nothing in dentistry was productive of more generally satisfactory results than fixed bridge work. I have always maintained this, notwithstanding the criticism that has been made many times that too much fixed bridge work was being inserted in the mouths of our patients. I am willing to admit that entirely too much fixed bridge work is being built, but if it is placed where it is indicated, there is really nothing more satisfactory. The trouble is we have been abusing the possibilities of fixed bridge work. Appreciating the advantages of this more or less permanent attachment to the remaining natural teeth, we have lost sight of the question of dynamics and of strength and permanency, and often it is placed in mouths where it should not have been placed, and where removable work should have been inserted, and fixed bridge-work has been condemned on account of that failure. The principle was not wrong at any time, but it was simply faulty application.

I was glad to have the essayist emphasize the fact that we should make a study of our cases before we proceed with the construction of the work which is required. After having had many years of experience in mechanical work of almost all kinds, I would not have the courage, even now, to start or undertake any piece of work in the form of a removable denture without first making a study model, and studying the requirements of the case and planning it before proceeding with it. If this is done, you have something to guide you because you know before you begin exactly what you are going to do and how you are going to do it, and that will aid you materially in the results you obtain.

In the successful application of removable structures two considerations are essentially important at the very outset. First, to study the teeth that are best adapted to the purposes of sustaining the fixture, because the entire success of the whole structure will depend upon the proper selection of the teeth which are going to support it. That having been determined, the next

essential feature to be considered is—what type of attachment will best support the structure?

There are many useful methods of attachment, most of which have been mentioned by the essayist. Personally, I divide the consideration of attachments into three general classes. First, the “clasp” class, or that class of attachments wherein the principle of the clasp is used, and I want to say in conjunction with what Dr. Coltrin has said, that there is nothing, in my opinion, more useful as a method of anchorage for removable bridge dentures than some form of clasp.

As to whether we should use a wide clasp to which the essayist referred at first, or the wire clasp, it is a matter of personal preference. Both have their advantages. Until recently, or within the last two years, I preferred the wide clasp accurately adapted to the supporting crown of the tooth. A wide clasp, coming in contact with the crown, with a multiplicity of contact points, has given me the best service of any one form of clasp up to two years ago. Two years ago I made clasps of iridio-platinum wire, 18 gauge, and have had splendid results with the use of that type since then. The results have been so good that I have been more or less inclined to give this type of clasp preference over the wider telescoping clasp.

Some form of occlusal rest which will prevent subsequent settling of the case, however, is always absolutely necessary. If such a provision is not made the case will settle; the occlusion will be lost, and injury to the soft tissues must result, so that whatever attachment you use, or whenever you employ a clasp, it should be so supported against the possibility of any great amount of subsequent settling as will preclude these conditions.

I am very glad to have Dr. Coltrin call our attention to the grasping properties of a clasp. I have seen clasps adapted to teeth around their circumference, as shown in figures 6 and 7, but a clasp of that kind has not the power of grasping. It encircles but two angles, and does not extend far enough to hold itself in contact with the teeth. To hold itself firmly in contact, it must take in three angles.

Dr. Haskell told us many years ago that in proportion as our artificial denture, whether it be full or partial, becomes movable, and floats around upon the tissues which support it, in that same

proportion would it stimulate absorption, and I believe that this is true, and this is one of the reasons why removable structures should be more or less securely attached to the supporting teeth. Believing that the firmer they are held in their position in the mouth, the less absorption will take place under them, I agree with the essayist in that some form of occlusal rest must always be used.

The type of attachment that I have used with the greatest amount of success next to some form of clasp has been entirely overlooked by the essayist. I refer to the "tube post" method of attachment, as applied particularly to the roots of teeth. In my judgment there is no better form of attachment than where we can box up the end of the root with a good fitting cap, slightly elevated from the cervical tissues, and containing a tube with the apical end and seam closed, and the root thus boxed up, then having a crown and post going down into it, which is to become a part of the movable fixture. In those cases where you have to supply the posterior teeth without any posterior anchorage, and particularly in the upper arch, this type of attachment is especially indicated because of the fact you have a greater area of actual surface contact, one surface telescoping into the other, thus affording a greater degree of stability than is to be obtained with any other form of attachment you can use.

This gives us two types of attachments, the various forms of clasps and the tube and post, and the third class consists of the various manufactured attachments. Among these it has been my experience that the Morgan attachment takes up less room, is stronger, and supports the fixture better than any other type of manufactured attachment we have. In my opinion this attachment is particularly useful when applied to the upper arch, and is better than any other type except the tube and post when you are called upon to supply the posterior teeth without any anchorage at either heel, for the reason that we have an increased area of contact between the parts in their relation to each other, and as the area of contact increases the stability is greater, and as it decreases you lose stability in proportion. I have not been as successful with the "Roach" attachment as Dr. Roach has been. It does not give the desired stability, particularly in the upper arch, and hence it has now been more than three years since I

have used it. The same thing applies generally to the "Gilmore" attachment. I do not get the same successful results with it—in the upper arch—that I can get with any of the others to which I have referred.

This leads us to the central thought emphasized in the paper. While the possibilities of this class of work are great, it becomes necessary to study our cases and select the methods with wisdom, care and caution, and if we do this there is no question but that we will be able to give to our patients a high class of work—a class of work which will give them probably more comfort and permanency than any other class of work next to practically applied, sanitary fixed bridge work.

DR. C. W. COLTRIN (closing the discussion):

I wish first of all to thank Dr. Goslee for the splendid discussion he has given my paper. Few men in the profession are as able in all ways to discuss a paper on this subject as Dr. Goslee. When at a late hour it became known that illness would keep Dr. Roach from the meeting, I asked Dr. Goslee to take his place on the program, which he has done without having had an opportunity to read the paper or make any preparation. What he has said is of great interest and if kept in mind will be of use and profit to us all. He called attention to the fact that in my classification of attachments, the telescope crown and "Peso" Cap and tube device were omitted. I will say that I had intended to mention the telescope crown, but found I could not do so without adding materially to the length of my paper which was already too long. Again, this subject is so large that it can not be covered in a single essay. One could more easily write a book on it than a paper.

In regard to what Dr. Goslee said about the use of the Morgan attachment, I can not quite agree with him. In using this attachment in cases where the posterior teeth are to be supplied as shown on Chart (No. 3, Fig. 1) I think that in these cases this form of attachment is apt to produce too much leverage on the abutment teeth. While it will securely retain the denture, it is too rigid and lacks adjustability to the movements of the denture as the saddles are forced upwards or downwards at the back. In cases as shown on (Chart No. 9, Fig. 1) they are a most useful and efficient means of attachment.

I am sorry that illness has prevented Dr. Roach from being present to discuss this paper, for he is a master of the subject and would have elaborated many of the points which I could but touch upon in a general way.

It was a further disappointment to me that the general discussion was not taken up by some of those present, for I had hoped to learn something from you.

DISCUSSION OF DR. ROBINSON'S PAPER, "A SYSTEM OF POSITIVE AND PAINLESS TOOTH MOVEMENT."

DR. CALVIN S. CASE, Chicago:

When I was invited to open the discussion upon Dr. Robinson's paper, I accepted with the proviso that I receive it in sufficient time to give me an opportunity to prepare a thoughtful discussion. But when I came to read the paper without a single illustration, though the descriptions are doubtless as perfect as word pictures could make them, I found that it would be impossible for me to prepare beforehand an intelligent discussion in regard to the practicability and applicability of an apparatus of so intricate a nature from its description alone, nor would I feel justified, without some practical experience in its employment, in saying anything specifically, pro or con, in regard to what would seem from the essayist's description and claims, to be a complete, rounded out system of orthodontia, quite different in its technic and application of force from anything which has heretofore been attempted, and one moreover which is a vast improvement over all other methods of regulating teeth.

And now that circumstances have arisen which will prevent me from attending the meeting, I should like to express in writing my sincere pleasure in this added evidence of the rapid advancement of orthodontia, and to congratulate this branch of our profession upon the possession in its ranks of such men as Dr. Robinson, who are capable of displaying so much ingenuity, skill and persevering energy, as that which is evidenced by his paper.

If Dr. Robinson's claims are true, and I have no competent reason to doubt them in the main, we soon will be able to construct regulating appliances which are simple in mechanical

technic, and which are all practically alike, except in slight variations in direction of force to meet required demands, and with power and movement under "absolute control," with "guessing eliminated." With this universal apparatus we will be able to correct all characters of malocclusion "painlessly," and without even the "slightest soreness of the teeth."

Moreover, what seems to be the most wonderful of all is that this apparatus will require so few treatment adjustments, consisting of only from one to five applications of force during periods of regulating which extend from 6 months to 2 years, and then when completed, retention is comparatively a negligible factor, accomplished by leaving the same apparatus on the teeth a few months longer; the unusually short time of retention being due to the peculiar method of movement, which "requires a minimum of retention."

Only a few years ago, when we were told by some seemingly hair brained individuals that aeroplanes would accomplish what they did a short time afterwards, we laughed at their ideas as absurd and foolish; or had we been told less than a year ago that upper air and submarine craft would accomplish what they have, it would have been relegated to the unthinkable along with the tales of Jules Verne. And even today, with practical demonstrations of these possibilities before them, it has seemed to be impossible to arouse from apathy and a sense of security the Admiralty of a great nation like the British, to take precautions easily within their reach that would have rendered the Lusitania disaster an impossibility. It is so difficult for human nature to get out of time worn ruts, and accept the truths of new ideas and new methods of accomplishments. Let us hope that Dr. Robinson's invention will accomplish all that he claims for it, however unbelievable it now seems to be. For even if it is possible to correct, as he has outlined, that large class of malocclusions in Dr. Angle's class I, as well as the less difficult ones in classes II and III, it should be regarded as one of the very greatest advance steps in orthodontia.

I perhaps may be excused for a certain degree of skepticism in regard to its effectiveness and superiority over other methods in very difficult complications, and in those capital cases of malocclusion which daily confront us, and that involves extensive

dento-facial deformities, but I nevertheless wish to assure the essayist that I will make practical tests of its value, as soon as I can become instructed in the art of its construction and application.

One of the most pleasing things to me in this paper, and also in other recent papers which have described the new Angle apparatus, is the present unhesitating acceptance, and enthusiastic acknowledgment, of the principles of bodily movement of teeth. This willingness to lay aside differences of opinion, and accept a truth that has been fought over for 20 years, was certainly a great step toward producing the recent rapid advancement of orthodontia, and one moreover which I believe to be the legitimate mother of these ingenious appliances, which are calculated to establish the universal advantages of this great principle in orthodontia.

At the present time I must say that I am unable to understand why it seems to be invariably necessary in the bodily movement of teeth, that it shall be accomplished through the torsion spring force of a wire, or some form of an arch bow, and with this force applied within the small scope of the width of a tooth band, when a far greater mechanical advantage may be secured by applying the direct spring force of the arch bow to the roots of the teeth through the medium of rootwise extensions soldered to the bands, both for the bodily expansion of arches and the bodily antero-posterior movement of the front teeth, with no special complication in construction, and with absolute certainty and control of action. It moreover would have the advantage in those difficult cases in which perhaps Dr. Angle's and Dr. Robinson's apparatus may fail, of employing methods of long and tried usefulness, founded purely upon simple scientific principles of mechanics, and attested by hundreds of the most difficult bodily movements, during a period of nearly 25 years of experience.

I wish further to say that in those instances where the propelling force is that of a screw, it does not necessarily imply that an immediate and positive tooth movement occurs at the moment of turning the nuts, as the essayist implies in his first "objection." There are two reasons why this is not true. Tooth movement, orthodontically considered, occurs by virtue of a movement of the walls of the alveolus. Between the wall and the root of the

tooth is the elastic membranous tissue, which soon becomes more or less thickened by inflammation and infiltration, thus acting as an elastic cushion. Into this cushion a large part of the power of the movement is stored as potential energy or force, on the same principle that a spring wire is stored with potential force when it is forced out of equilibrium, and this force is slowly expended in its pressure against the alveolar wall for its gradual absorption, or in the bending of its fibrous and elastic structure.

Again the turning of nuts at the ends of arches or power bows, does not imply an immediate positive movement of the tooth or teeth to which the force is distributed, because a certain part of the power goes into the spring of the bow to be stored, as before, as active potential force.

It may therefore be stated as true that all true orthopedic tooth movements occur by virtue of the action of potential energy or force in some form or another. The difference between the so-called positive force of a screw and the elastic forces, is that in the latter the force can be distributed evenly over a long period, which is of very great importance when it can be controlled in the movement of teeth, and one which I invariably take advantage of whenever it can be effectually applied.

It will be seen by this that it is not a fair statement to imply that in the employment of a screw force the teeth are moved by sudden steps, with rapid diminution and early loss of power, and with consequent unnecessary pain at the time of its application. Those who employ the screw force judiciously never turn the nuts beyond the true possibilities of the elasticity of the appliance and the cushion elasticity of the peridental membranes, and I am pleased to assert after many years of experience, that if this force is judiciously applied and gauged as to amount, and intervals of time, there is comparatively no pain from the screw force after the teeth commence to move. The only pain in this method of regulation occurs when it is necessary to make sudden changes. Let us hope that the method which Dr. Robinson is introducing will eliminate many of the needs of changing appliances and frequent adjustments.

DR. T. L. GRISAMORE, Chicago :

I would like to add a word or two after seeing these pictures. Under the title of "painless orthodontia," permit me to state that

it should be the aim of every man when he starts in orthodontia, to enlighten himself upon the conditions under which, if he operates, he will cause pain to the patient and under what conditions he will not cause pain. That should be the first aim of every dentist. It is unnecessary even with the old appliances to cause pain to patients, provided those appliances are properly adjusted. It does not require sufficient pressure upon a tooth to cause pain in order to cause a tooth to move. Of course, in some cases it requires more force to move a tooth than it does in others. In these cases, as in all others, we should start out with a slight pressure, then if the tooth does not move, we can increase the force until the tooth begins to move, then the force may be diminished, because it requires less force to continue movement than to begin it.

There has been a great deal of discussion about the screw and spring force. I believe in many cases, where we can utilize screw force it should be done, and especially by men who have not had a large experience, or by young practitioners, who do not know the results of spring force. It is safer for them to use screw force with a nut to tighten. When a patient is in your office and you tighten the nut, at that time you have the greatest pressure on the tooth that you will have at any time, although Dr. Case states that the pressure does not stop at that time, since the periodontal membrane becomes thickened, causing a continuation of the pressure for some time after the application of force. If you apply spring force and you do not know the conditions you have to contend with, you are liable to cause the patient considerable annoyance. Spring force when judiciously used is one of the most effective as well as the most convenient methods we have in moving teeth, but it seems to me there can be no question but what we have been using larger wire than is necessary. Personally, I do not think I use more than one per cent, of wires larger than 20 gauge, and that one per cent is mostly 18 gauge wire. I think you will find in all patients under 12 or 13 years of age, 20 gauge wire is sufficiently powerful to expand any arch that comes under your care, at least that has been my experience.

Regarding Dr. Robinson's paper, he has given us a wonderful apparatus, and if it does what the author thinks it will do,

and I have no reason to doubt what he says, it will be a great thing for humanity. It will enable the dentists of this country to take care of thousands of cases more than they do at the present time, because we will only have to see a patient five or six times to correct a given case. It will enable them to reduce their fees so that it will permit everyone who needs to have their teeth corrected to do so. Dr. Robinson has tried this apparatus for a few months, but the rest of us have not tried it at all. Let us take the mouths of patients of about the same age and to all appearances it will require the same amount of pressure to move a tooth or teeth. If we work according to the system outlined by Dr. Robinson, and put this appliance on, and leave it alone for a number of months we do not know whether it is going to move the teeth or not. At any rate, it will be some time before we find out whether the teeth are going to move. The amount of pressure that will move some teeth will not move others, and that is an important factor we have to take into consideration. Another condition is the retention. Dr. Robinson's theory is that he brings the teeth to the desired occlusion in a few months and has only to retain them about that length of time. We find that the longer we take in moving teeth, the shorter will be the time of retention, other conditions being equal. With his (Dr. R.) method it is the opposite. The shorter the time it takes to move the teeth, the shorter the time to retain them. I cannot understand why teeth will not have the same tendency to return to their former position after having been moved by this apparatus that they do when moved by any other appliance.

I want to compliment Dr. Robinson on this paper and I wish to say to him that I shall certainly try his method and his apparatus.

DR. S. W. FAHRNEY, Chicago:

After reading the principal parts of the paper we have just listened to and also hearing a detailed description of some of the more important points mentioned in the paper, I came to the realization that some of our methods for regulating teeth would undergo a change. During the fifteen years that I have been working exclusively in this branch of dentistry I have not confined myself to any particular form of appliances. Especially is this true of my work during the last six or seven years. I

have used large and small appliances of nearly all kinds and descriptions. Some of them, although worn with comfort after the stage of fitting and adjusting to position had been passed, were severe on the patient. It was with regret that I was compelled to use certain appliances and any of my fellow practitioners who have tried to gain a controlled root movement know of the difficulties encountered. This is one form of tooth movement, the accomplishment of which has required the use of appliances which were rather severe at times, although the results gained were very pleasing and satisfactory.

When I read Dr. Robinson's paper and thought of his method of applying a small but constant force, the system appealed to me for several reasons.

The pain would be lessened, if not entirely done away with, and by having the force applied so slowly and evenly it would not be necessary to see the patient so often. These two points can be appreciated by both the patient and the operator.

The method advocated by Dr. Robinson seems so simple that any operator exercising a reasonable amount of care should have success. In making the band no particular position of the small attachment is really necessary, for in putting the wire to position it can so easily be bent to fit. The shaping of the wire is of course the principal feature and upon this depends the success of the appliance.

The orthodontist is tied to his work a great deal more than some of our brothers in general practice may think. The general practitioner can take time for a nice long vacation after he has put the mouth of his patient in a comfortable state and continue the work upon his return, but not so with the orthodontist. With a reasonably large practice, the orthodontist of today is held by one case or another and if he goes away for any great length of time it is detrimental to good work on some of his cases. This is the fault of the methods that have been employed up to the present time but Dr. Robinson has given us some plans which greatly change matters in this particular.

The treatment outlined by the essayist is the fitting of an appliance to position and allowing it to remain for quite a long time undisturbed. Dr. Robinson says the majority want to change the appliance too often and suggests that seeing the

patient once in several months is sufficient. This seems to be too long a time between sittings unless the operator is sufficiently experienced in the shaping of the small spring wire.

It has been suggested that by the use of this method the fees for regulating teeth can be greatly reduced, but by giving the patient better service, with less pain accompanying the operation, is not the operator entitled to just as large a fee as before?

It gives me great pleasure to express my appreciation of the ideas given to us tonight by the essayist. He has given us a new foundation to work upon and it will be with pleasure that I shall take up this new line of treatment and try to discover its good and bad features.

DR. FREDERICK B. NOYES, Chicago:

I am very glad indeed to speak on this paper, because, it seems to me, Dr. Robinson's paper belongs to the new era in orthodontia. It is a presentation to this society in a very clear and very nice way of the great change that is going to be felt all over the country very rapidly in regard to orthodontia appliances. There is bound to be an enormous revolution in the entire character of such appliances.

For a good many years I have had something to do with the teaching of students of orthodontia, and for the first five years of that time I was doing no orthodontia at all, but engaged in general practice. During that whole time I preached that we were using too much force. Now, in spite of that, when I began to practice orthodontia myself, I made the mistake of using too much force, and I found it out in my own practice. That little wire has plenty of force in it, and it is an expression of the idea that you may have heard before that the teeth are moved by tissue reaction and not by mechanical pressure. You use mechanical pressure to bring about tissue activity. In the use of the old methods the teeth were sore because you abused the tissues and you had inflammation as a result. I think it would be hard to say how far-reaching this kind of thing is going to be in orthodontia. The fundamental principles involved in the new Angle appliance—I mean the tube and pin appliance—is the idea expressed in this paper. The only essential difference between this appliance and the Angle tube and pin appliance is the character of the attachment to the band. In that respect, I think the essay-

ist is hardly fair in the statement of his objections to the tube and pin appliance. For a good while, that is a year or two, a large proportion of my cases have been treated with tube and pin appliance. In none of them did I use a wire heavier than .030 of an inch for the arch, and in a good many of them, especially the ones of the character shown on the screen I only used .022 of an inch, the same size as the wire used and described by the essayist. At the time the tube and pin appliance appeared, it was perfectly evident to me and to many others that the great fault with that appliance was that the technic was so difficult or exacting that but few men could master it. After coming back from a visit to Dr. Angle I spoke of the appliances and described the technic and the exactness they required to Dr. Prothero, and I asked him how many men in the senior class of two hundred could be trained to work in terms of thousandths of an inch, and he said maybe two or three. I am not sure that he did not exaggerate the number. There are comparatively few men who will adopt a technic that requires accuracy in terms of thousandths of an inch, and such accuracy is required in the tube and pin appliance. Anything then that makes the principle of the tube and pin appliance available with the elimination of that tremendously exacting technic, is an enormous advantage to all those who want to correct irregularities of the teeth.

The other thing which limited the usefulness of the tube and pin appliance was that, in order to apply it successfully there is practically required at the beginning of the treatment a perfectly clear conception of exactly what movements are to be accomplished in direction and extent. A man, before he made his original appliance, had to have a perfectly clear vision of his whole treatment, and that was what limited the tube and pin appliance. There was no leeway. You have got to be exact in the determination of the distance and direction of the movement of every individual tooth. Now, that in my opinion was an advantage because appliances will not correct malocclusions. The trouble with correction of malocclusion is that most men that try it do not know what they want to do. It is not that they have no appliances to do it, but this appliance or no other will tell them what to do. They have got to study the science of occlusion and the principles of orthodontia to apply this appli-

ance or any other, and if you could limit the treatment of malocclusion to the men who are willing to master a definite, difficult technic, you might have some hope of limiting the treatment of malocclusion to the men who have ambition enough to study the principles so that they understand the treatment. It would be a blessing, if it could be made impossible for a man to treat or to attempt to correct a malocclusion until he knew what he wanted to do.

I feel as though I have to differ with the essayist in his analysis of the objections, both with respect to the expansion arch and the pin and tube appliance. His first objection to the expansion arch, referring to the screw first, is the basis of more failures in the application of the old expansion arch than all things else put together, and it is absolutely contrary to the teaching of the man who invented it. The screw nut on the expansion arch was never intended to do anything but adjust the size of that arch. It was not intended as a means of applying force. The expansion arch was intended to be adjusted in its proper relation and the pressure on the teeth applied by springing the arch by pressure of the fingers on the tooth and arch and using the ligature simply to fix it. Ninety-five per cent of the people who have ever used expansion arches did one of two things: They either put the arch against the labial surfaces of the teeth, ligated them there and turned the nuts to get pressure, and tipped the molars into all kinds of positions, and got no movement of the teeth they wanted to move; or they adjusted the arch at the proper distance from the teeth and twisted the wire ligature trying to make it pull like a screw. Both of these things are contrary to the technic of that arch. It is not fair to make that objection to either the tube and pin appliance or to the old plan of arch appliances. It simply means the technic of the appliance was not understood. The appliance was not used as it was intended to be used. The old appliance cannot be adjusted so that it will not demand attention once a week. You are using a stiff spring, working in a comparatively narrow range, while the essential principle of the pin and tube appliance, or the appliance of Dr. Robinson's, is that it has a light spring which works through a comparatively wide range. There you have a difference, and in addition to that the attachments are of such a character they do

not become displaced. As soon as the tooth is moved enough to relieve the stiffness of the heavy arch spring the ligature becomes loose and gets displaced, slips off, and the tooth will move back as much as it had moved forward. If the wire ligature has come off before the patient comes back to you the teeth drop back to where they were, consequently it is necessary to see these patients often. I have said a good many times there were two things which made it necessary for the operator to see his patients often in orthodontia cases. One was the appliance would not stay adjusted, and the other was that the operator did not know what he wanted to do and had to see the case often to know that nothing was going wrong. Of those two things, one of them is eliminated by this appliance. The appliance will stay in adjustment, but do not make the mistake of thinking because it will stay in adjustment all of the difficulties are solved. If you make a wrong adjustment and let it go for a month, it will go wrong for that length of time, and you must know what it will do during that month before you make your adjustment. It is certainly true that it is a great deal better to see a patient once a month and carefully study the case to determine exactly what is to be done. You cannot do that in a minute and make careful adjustments that are to work for a month. It saves the patient three trips and incidentally it is more nearly a physiological performance. You are working more nearly as Nature intended to work, so that it is of enormous advantage in the development of the practice of orthodontia.

The only serious fault I want to find with the paper of the essayist, and it was not in the paper or in anything he said, but it is the implication that now it is so easy, anybody can do it. You have got to study the principles of orthodontia just as thoroughly and just as carefully to apply this appliance as any other and perhaps a little more so, because you are not watching your cases as closely. I sometimes think that orthodontia is a little like what a physician once said about medicine. He said in speaking to a young graduate that eighty per cent of the patients whom a doctor is called to treat will get well if you let them alone. There is a large proportion of cases of orthodontia in which the use of a superficial idea of bringing teeth into line, and the application of most any sort of an appliance will bring out a very satisfactory

result to the patient; but there are other cases that are so complicated that a solution is almost hopeless. I think everybody who practices orthodontia finds out that there are some cases he would like to have somebody tell him about, no matter how hard he studies.

The great point to me in this paper is that it presents a change in the character of the application of force, and if it is emphasized properly as it should be, it will throw the emphasis upon the diagnosis, the working out of Nature's plan, and in that respect I want to refer to a case he showed.

You will remember the upper model (I will not refer to the lower now), two laterals, lingual, the cuspid in labial occlusion. That case was caused by some disturbance of the normal relation of the root of the temporary cuspid to the tip of the permanent cuspid. The temporary cuspids with the laterals and centrals were not carried labially and occlusally as they should have been by the eruption of the cuspid, and the cuspid came through in labial position and as it was forced downward it forced the lateral lingually. That is what happened. All that was necessary in the correction of that case, if caught at the right time, was to put little bands on the teeth which would hold the centrals and laterals in their alignment and throw a spring spur around the tip of the cuspid to make it do what it had failed to do. The essayist said that no expansion had occurred in the molar region. None was necessary.

The normal forces were at work in the molar region and all that was necessary was a clear conception of the cause and the applying of the means to develop the normal condition.

In this case this appliance is absolutely ideal. I have a case now under treatment with bands and pins appliance which is identical in the essential points. You do not have to see these patients but once in a long time. When you work with a clear conception of exactly what is wrong in the mechanism of development, you can use your appliance in supplementing the natural forces.

DR. M. D. K. BREMNER, Chicago:

I am not an orthodontist, and I do not know enough about this subject to discuss the paper from either a scientific or technical point of view, but merely as a dentist who knows something

about orthodontia, who has studied it at school. The essayist seems to have made a very revolutionary discovery, and if he is right, and if his system is correct, it is a splendid thing. After listening to those who have discussed the paper and who know much about the principles of orthodontia, it seems to me the essayist is right. What particularly interests me is the economical feature. At last, we have a method whereby most of our patients—the everyday child, the little boy and the little girl who come to us and whom we feel would need orthodontia work—can be treated at a great deal less expense than in the past. Heretofore, we know it was practically out of question for these poor people to have the services of orthodontists. Now, with this method or with this system, we can hope to accomplish much more than has been done in the past. In other words, we will be able to do so much more orthodontia work in less time. Orthodontists will be able to take care of more cases for less money and make just as much in the end, and it will open up a field for a great many young men to enter and do the work which needs to be done.

Another point which occurred to me while I was listening to the paper was the amount of time, labor and effort and thought and money spent by the essayist to come here and present his method. I myself have done very little original work, yet I can imagine the great effort it has taken for this gentleman to carry on this work and to come here from the Pacific Coast to deliver his message to us, and he is not charging anything for it. Of course, it would be contrary to the ethics of our profession to do so, and I am glad to be a member of this profession. I want to say this, that I envy the essayist, because I think he will undoubtedly be a benefactor to humanity, and this knowledge is great enough reward for anybody.

DR. ARTHUR SMITH, Peoria:

I do not consider myself qualified to discuss this excellent paper from a technical standpoint or from the standpoint of orthodontia, and since we have had a competent orthodontist in this part of the country I have not undertaken a single case in my own practice. I want to say, however, that seldom in my life has it been my privilege to listen to such a lucid description, given in such excellent English and with such splendid pro-

nunciation as this, and I did not want to let the essayist go away from here without having said that in his presence.

DR. J. T. MOHAN, Pontiac:

There is one question I would like to ask Dr. Robinson, and that is, what attention he pays to the tonsils and adenoids in cases of orthodontia, in his practice?

DR. C. N. JOHNSON, Chicago:

Before Dr. Robinson closes the discussion, I want the privilege of saying that we appreciate very much the fact that he has come all this distance to give us this paper. I want to say, further, that Dr. Smith has expressed my sentiments precisely in saying that this is one of the most clean-cut papers we have ever listened to, and I could not let Dr. Robinson close the discussion without having told him how much we appreciate it.

DR. ROBINSON (closing the discussion):

The objections which have been raised by Dr. Case are first, that it is complicated. I believe it has fewer complications than any other appliance before the profession today. It consists of nothing but a seat, block with lock pin and the arch wire—nothing else. Second, he says the screw does not produce immediate movement. I have never tightened a screw, that I have not gotten immediate movement. The spring on the other hand does not give this action.

Dr. Grisamore says that the screw is safer for the reason that you put on all the force that is ever going to be applied at once, and that with spring appliances, you do not know where it is going to stop. Also, if the patient is away from you three or four months, there is danger of moving the tooth too far. In answer to Dr. Grisamore, if he will follow the technic given by making the wire arch in the form and shape of the true dental arch, the tooth cannot move farther than the arch was bent originally. The abrupt application of force by the screw which he recommends, is one of the objections to the older appliance.

He tells us that the orthodontists use from .022" to .030" with the tube and pin appliance. Dr. Angle, I believe recommends .030" and most of those who use the tube and pin appliance, use that size. Your essayist, believes these to be too large and unyielding, he uses Tungsten wire .017" to .020".

Dr. Grisamore also says that when we put on this appliance

and send the patient away for a month, we do not know whether the tooth is going to move or not. I believe we can all agree, that when pressure is constantly applied for a period of a month or so, there is bound to be movement. Does he question that the appliance will produce the continued pressure, or does he question the fact that continued pressure will surely produce movement?

Dr. Grisamore also stated that the assayist said, that if we move a tooth in a short time, that we only need a short period of retention, whereas, he has been taught and has always taught, that if you move a tooth slowly, you need only a short period of retention. With the appliance that Dr. Grisamore and the rest of you have been using, we applied force and caused a tooth to move for a few hours, and it then stopped, and the next week we move it again for a few hours and it stops once more, and so on. With this appliance, the tooth moves more hours per day than with the old appliance in a month.

Replying to Dr. Noyes, who said the only difference between this appliance and the tube and pin appliance, was in the attachment. There is less difference in the attachments than there is in the arch. These little loops, which extend up over the gum, are the secret of the whole thing. You can use the tube and pin if you put the loops in the arch, and you will get the same results that I have shown you. The real thing which allows us to secure these results is the constructing of the arch with the loops.

Dr. Grisamore said that your assayist implied that anybody could use this appliance. He did not mean to imply that. We cannot all use a knife and fork properly. If we cannot do that, surely all of us cannot use this or any other appliance correctly.

Dr. Noyes said the only thing necessary in the case to which he called attention was to bring out the two laterals and put the loops up over the cuspids. He said there was no expansion in the molar region and that none was necessary. There was not, after the first application of force, but after the second application of force you will find there is more than one-eighth of an inch expansion in the first molar region and there was not enough then. It was a case that required great expansion.

In reply to the gentleman's question regarding the enlarged tonsils and adenoids, if we even attempted to discuss the question

of adenoids and enlarged tonsils, we would be here until the sun comes up in the morning.

We are discussing an appliance, its operation and its application to these cases, and time does not permit me to go into the matter of enlarged tonsils and adenoids.

There is one thing I wish to make clear, and that is with reference to patents. This appliance I have shown you tonight is patented. Last year, at a meeting of the American Society of Orthodontists, I offered to present the patent to the society. There was some question in their organization as to whether they should accept such a gift or not. After waiting some time, it being found necessary to spend a large amount of money on the appliance, the offer was withdrawn. I wish to say, however, that if any royalties ever accrue they will be turned over to some worthy fund for the advancement of dentistry.

DR. J. F. MOHAN, Pontiac:

I came here to learn, and the reason I asked a question was to find out how much attention Dr. Robinson is paying to enlarged tonsils and adenoids. There are many men who are interested in finding out what Dr. Robinson's ideas are.

DR. ROBINSON:

In answer to the question, let me say that there is no child with adenoids, who is strong enough to stand an operation, who should not have them taken out. Adenoids need attention, and the first operation is not necessarily the last. Even though the operation is done well and by a skillful man, it frequently has to be repeated, and, if necessary, should be. Adenoids are the cause of a great many cases of malocclusion.

DISCUSSION ON THE PAPER OF DR. GILMER, "THE SIGNIFICANCE TO THE DENTIST OF ORAL INFECTIONS IN THEIR RELATION TO SYSTEMIC DISORDERS."

DR. ARTHUR D. BLACK, Chicago:

I have for some years followed the ideas and the work of the essayist, and I have been close enough to him to appreciate his care and thoroughness in everything which he undertakes. I am, therefore, both now and in the future, always willing to accept without question anything which he may bring to us.

For this reason, I am not going to discuss directly the propositions which have been presented in this paper other than to utter this general statement of agreement.

The dental profession is today in a different position from that which it has ever heretofore occupied in this matter of the relationship of the mouth foci to general systemic conditions. We have come to recognize the direct pathological relationship between the mouth and the general system. The medical profession also recognizes this relationship, and what is quite as important, the general public is coming to appreciate these things, largely as a result of the attitude of the medical profession. There is placed before us the opportunity, as we have not had it before, to advance the standing of dentistry in the minds of both the medical profession and the public by developing our knowledge of this relationship and applying such treatment as will prevent or eliminate mouth foci of infection.

I wish to present as my discussion of this paper a statement of the chronic foci in the mouth which bear a relation to the general health of the individual. We may divide these into three principal groups. Dr. Gilmer has mentioned a number of diseases which commonly occur secondary to local foci of infection. The recent studies of Billings, Rosenow and others have shown that these infections occur generally through the blood stream and seldom through the lymph channels, which means that the location of the secondary infection bears no relation as to proximity to the original focus; that infection in the heart, the kidney, or anywhere, may occur just as readily through the blood stream as an infection in tissues in the neighborhood of the original focus. We have then to consider, as we study the pathology of the mouth, those conditions which will afford the opportunity for the organisms which cause the secondary lesion to gain access to the blood stream. In mentioning these I would like to lay the greatest stress upon the diagnosis, because if we can recognize these conditions, the treatment of them becomes comparatively simple. A proper diagnosis cannot be made by a cursory glance at the mouth of the individual, but only by a careful and thorough study of each case. The examination should be the same, whether the patient is suffering from systemic infection or not, because it is recognized that most of these

secondary diseases mentioned by Dr. Gilmer come on insidiously. Their onset is not observed by the patient; they have made considerable progress before they go to their physician for treatment, and in a large number of cases the condition has then progressed to the point where they will be incurable or very difficult of management by the physician. The most important service we can render in connection with this group of diseases is to make most thorough mouth examinations and then, by the early elimination of mouth foci, prevent the establishment of the serious secondary lesions.

In the first group of chronic mouth foci, deposits of salivary calculus should be placed. In the mouth of a patient who presents with heavy deposits of salivary calculus, say to the lingual lower incisors, it will be observed, following the removal of the deposits, that the mucous membrane which was in contact with the lower border of the deposits presents a raw granulating surface which bleeds freely. This means that in that area there are many new and thin walled blood vessels, which afford easy access to the blood stream for all of the organisms in contact with this surface. This represents a group of conditions which is simple in its treatment. We know that the removal of these deposits results, within a few hours or a few days, in the healing over of the granulating surface, so that the danger of systemic infection is almost immediately passed. We need to recognize in this group of cases the simple pathological conditions which present. We need in our management of these cases to do our part by cleaning up the mouth, and it is of quite as much importance to impress upon patients the danger of neglect of their care of this condition and to interest them to the extent they will prevent a recurrence of these deposits. We should keep this group of cases entirely separate from the group in which we have pus pockets alongside of the roots, because we do not often see the stripping of the peridental membrane and the formation of pus pockets as the result of deposits of salivary calculus. In the same group we may place all those conditions in which there is inflammation of the gingivae from pressure. Under that head I would include crown bands, bad margins of fillings, bridges which are in pressure contact with the soft tissues, or anything which, as a result of pressure keeps up irritation and gives a con-

dition similar to that caused by the heavy deposits of salivary calculus.

In the second group I would place all those conditions which lead to the formation of pus pockets alongside the roots. That would include deposits of serumal calculus on the enamel under the free gingivae, and all of those injuries to the gingivae brought about by bad contact of teeth, from open spaces between the teeth, from any cause which would lead to food impaction, or irritation of the tissues within the subgingival space. In a pus pocket we have a most ideal condition for the transmission of bacteria to the blood stream. If there is a pocket alongside the root, the tissue overlying the denuded cementum presents a granulating surface. In that pocket, in contact with the granulating surface are not only the pus-forming organisms which have caused the pocket, but all the other micro-organisms in the mouth, which have easy access to the pocket.

We should recognize the fact that while the primary focus of infection in the mouth is a suppurative one, the secondary lesion is usually not suppurative, and therefore it would seem that the organism which causes the formation of a pus pocket is not the organism which causes the secondary lesion; or if it does, it has changed materially in its morphology in the meantime. All of the numerous organisms which are either constantly or accidentally present in the mouth have access to this pocket and therefore via the pocket they have access to the blood stream through the thin walled blood vessels of the granulating surface overlying the pocket. Therefore, in the treatment of these cases it is the plain duty of the dental profession to remove the danger of systemic infection from the pus pocket alongside the root of the tooth by whatever means may be necessary to that end, even though it may mean extraction of the tooth or teeth.

A third group of cases consists of the chronic alveolar abscesses, both the blind abscess and the abscess with a sinus. In these cases, the condition of the cementum following the detachment of the periodontal membrane about the end of the root is one from which the tissues cannot possibly recover while that root end remains. The granulating surface surrounding the root end affords the opportunity for the organisms which may be within that cavity to enter the blood stream. It would seem that this

type of cavity, which may not be exposed to the fluids of the mouth, might be less dangerous to the general health than the pus pocket alongside the root.

In the matter of treatment, second and third groups are more difficult to handle than the first, provided the teeth are to remain in the mouth. I believe the issue is squarely up to the dental profession to understand clearly these pathological problems and their danger to the general health. We must eliminate that danger from the mouth of the patient either by palliative treatment or by the extraction of the involved teeth. If an alveolar abscess can be cured by treatment through the canal of the root, then that is the treatment; if not, the source of danger should be eliminated by the resection of the root or extraction of the tooth.

I saw a case within the last week of a patient who was suffering from a myocarditis which had progressed to the point where it was serious, and after a thorough examination by a number of specialists, no focus of infection could be found. The last region to be examined happened to be the mouth, and radiographs were taken of all the teeth. These showed principally one thing, that a lower bicuspid tooth which was crowned had an abscess fully one-quarter of an inch in diameter about the apex of the root. Here was a tooth which was crowned possibly fifteen years before, a tooth which had never given the slightest trouble in mastication. There was no sinus. It was a blind abscess. There was no indication that there was anything wrong with that tooth until radiographs were made. The tooth was extracted at once.

I cite this one case as an example that the complaint of pain or soreness or lack of these things should not be our guide in the management of these cases, but that our management of them should be based upon the most thorough examination, which will include investigation of the attachment of the periodontal membrane to the tooth to learn how much detachment has occurred, and an examination by radiographs of the teeth the pulps of which have been removed. As a basis for a thorough examination, one should have a clear understanding of the various causes and conditions which may present.

One other factor might be mentioned: that probably only a small percentage of the individuals who have foci in the mouth

apparently suffer systemically; that is, we might examine the mouths of a good many individuals and find abscesses present, yet the physician, in a most thorough examination of those individuals, might find nothing wrong with their general health. That does not mean that we are justified in leaving such a focus of infection in the mouths of these individuals, because as I mentioned a moment ago, when the time arrives that the physician is able to diagnose a definite lesion—a nephritis perhaps—the time may have gone by when that nephritis can be cured. Therefore, it does seem to me we have presented to us in this class of cases a most wonderful opportunity to establish ourselves as full fledged members of the healing art by the prevention of a large percentage of cases of those systemic diseases which result from chronic mouth foci.

DR. TRUMAN W. BROPHY, Chicago:

The paper that has been read this afternoon has in it, I believe, the essentials covering the subject of oral infections. While Dr. Gilmer was reading his paper I tried to think of something he had omitted, but I was unable to do so.

Dr. Gilmer has told us of the importance of carefully considering these morbid conditions. He has told us that whenever we cannot suppress suppuration about the teeth by all the means at our command, then the proper course to pursue is to remove the tooth or teeth, with all of which I agree. But there is something, it seems to me, farther back than the essayist has dealt with on this question. It is this: The definition of medicine which has been given through the years by the medical profession is this: "It is the healing art in all its branches." Is it? Let us ask ourselves a question and see if we can get down to the very bottom of this subject and begin in the right place to upbuild a knowledge of pathology which will be to the benefit of mankind. We may do much in coming before bodies like this, pointing out errors which have existed in diagnosis in years past and which still exist, but to teach the student, while a student, the importance of these conditions, it seems to me, is far more important because students are numerous. Students are young. They carry away from school a knowledge that they get and use and disseminate it among their friends and they teach the public the importance of these things.

Now, how much is the medical profession of America doing to teach students dental pathology? I had an opportunity here today to glance through in ten minutes the unprecedented work of that magnificent man whose name and fame are cherished by this body, the work on "Dental Pathology" by Dr. G. V. Black. (Applause.) If every student of medicine were compelled to read that book and learn what is in it, then we would not hear so many complaints on the part of medical men who know little or nothing of dental pathology, who claim the teeth are responsible for all the ills they cannot account for in any other way.

Nearly all teeth are amenable to successful treatment if they are properly treated. If men do not know how to treat them, they resort to extraction.

While I want to compliment the splendid remarks made by Dr. Black, I cannot agree with the statement concerning the class of medical men who attribute so many ills to the teeth. Have they learned dental pathology? Some one has said that the lack of knowledge of the sciences in this country is appalling. Perhaps it is. What we have believed, in many instances, to be science, has proved a few years later to have been error. Some one has remarked, "Oh, Science, thou art so fickle, but art is with us forever." Many things have come in the last decade which have proven to be science. They have proven to be true, for science is the truth, and many things which have been said to be science are not science, because they have been proven to be false. And now in the consideration of this subject what we want is knowledge, and that knowledge needs to be made universal. What the dental schools in this country need to do is to teach men those things that have been considered here today in a manner that cannot be mistaken, and what the medical schools need to do is to do what they never have done, and that is to make the medical profession what its definition implies, "The healing art in all its branches." We know it is not the healing art in all its branches, because we know that there are only a few schools in which dental pathology is taught. I venture to say that the average graduate in medicine would not be able to make a differentiation in the simplest forms of dental lesions. He could not tell you the difference between sensitive dentine, an exposed dental pulp, a pulpitis, an incipient pericementitis or a

dento-alveolar abscess. He would only know there is something wrong with the tooth. Is it not a fact? How can these men be expected to go forward and treat diseases which have been presented to us this afternoon or to make a diagnosis on that ground? I am going to relate a little story that was told to a gathering of gentlemen a short time ago.

The new health commissioner of the city of Chicago said that as soon as he had been inducted into his office he began to ascertain what his duties were, and he found among other things that he would have to look after the garbage plant; that he must look after the smallpox hospital, the hospital for tuberculosis, the hospital for the poor, and many, many other things. So, he said, he went off to look at the garbage plant, but the gentleman who was giving the information kept on telling him many other things while he was going out. This reminded me very much of an experience a physician had in London. He visited the Charing Cross hospital and was escorted about by a very affable young intern who explained the condition of all patients, and while he was looking them over he was given the record, the name of the patient, age, and so on. The diagnosis was always written with abbreviations. For instance, *tb.*, tuberculosis, and so on. Every little while the physician would see the initials G. O. K. After a while he went to the young intern and said, "I do not understand the initials G. O. K. Will you please explain what they mean?" The intern replied: "Don't you know what they mean? They mean 'God only knows.'" (Laughter.) That is the condition of many patients who apply to physicians with infections from the mouth and teeth.

I hold that a tooth if firm in its socket even though it has a chronic abscess and provided the abscess has not destroyed more than one-third of the pericementum, no matter whether it is a bicuspid, a molar, or any other tooth, is amenable in an otherwise healthy person to successful treatment. You all know it is. You have treated such a tooth by excising the end of the root removed the disease around it and cured it. Such a tooth serves its purpose for many years, and is better than an artificial tooth. We do not want to get too far away from the subject of tooth conservation. A statement was made by an eminent scientist a little while ago that those dentists who extracted

decayed teeth were safer than those who were trying to save them. I regard such a remark as a reflection upon the honor and ability of members of the dental profession. I would rather leave the question of diseases of the teeth and their surrounding parts to the competent dentist to decide than to any practitioner of medicine who has never studied dental pathology. We must get down to the basic principles and teach young men and young women how to recognize these morbid conditions, how to make a distinction between a disease round about a tooth which is of a character that can be cured and the one that cannot be cured.

One of the greatest aids to the dentist that has been devised in the last quarter of a century, always at our command, is the Roentgen photograph. I believe every dentist should get a Roentgen photograph when in doubt about the strength of the roots of teeth and the conditions about them. If there is disease, he should cure it before he puts in a filling, adjusts a crown, a bridge, or an inlay. When in doubt he should seal it up with cement and wait to see if he can cure it. If the disease cannot be removed, or is inoperable, then it is time to remove the tooth.

DR. W. H. LOGAN, Chicago:

I did not have a chance to listen to all of the paper, but there are certain things that have been suggested which may need a further statement in reference to them, otherwise they may be misconstrued. We know it is possible for a systemic infection to result from chronic infections in the mouth. The health of a patient will never be what it should be when there is a chronic infection present. A patient may not die of a lesion that you can trace directly, but it is an established fact that you are shortening the life of a patient when you leave a chronic infection in the oral cavity, and you must not forget that. How much you are shortening the life of that patient will vary, of course, with the resistance of the patient. The time has passed when the dental profession can admit that it is all right to leave infection about teeth. Let no man here say that he heard it said at the state meeting of this society that infections do not interfere with the health of the patient. We are trying to save too many teeth rather than extracting too many. Men like myself and others are very liable to treat too many teeth with pyorrhea that need to be extracted, and too many of us are cutting off roots that

should not be cut off, but these teeth should be immediately condemned and extracted. (Applause.) I admit you can save teeth and make them comfortable, but I want you to admit with me that if there is any infection left, you are taking a chance that you have no right to take in allowing it to remain in your patient's mouth. A man has no right, as I see it, to treat pyorrhea teeth, place them in a splint, and let the infection return periodically. A man has no right to allow bone infection around the root end that causes absolutely no discomfort to that patient, and he should not allow the tooth to remain under those conditions. A single root end around which there is a chronic infection that has never caused or is now not causing any discomfort to the patient, will produce, according to blood examinations, more definite changes than will the average extensive case of pyorrhea. This is not a guess, but I am giving you the findings of case after case over a certain period of time. A heart lesion, a joint lesion, a kidney disturbance is a thing that you have no right to be responsible for as a member of any profession. Don't do it. Follow the advice of the essayist, cure, and cure now, or extract the tooth or dismiss the patient and let some one else take the responsibility.

DR. FREDERICK B. NOYES, Chicago:

A single remark from a previous speaker has called me to my feet. Science is never fickle except to the superficial. It never has been and never will be. Science changes, to be sure, but those changes are not fickle. Science changes with the advancement of truth. Our point of view changes with the increase of knowledge, and what was true before remains true still. There has been a great change in dentistry, and at the present time it is the duty of the dental profession to accept new points of view and we cannot hope to move forward by excusing our deficiencies because others are deficient. I want to cite but one instance of which I know the details.

A prominent man went to his physician, and the physician after a thorough and careful examination, finally requested radiographic examinations of the jaws. He found something which he did not like, and he referred the man back to his dentist, but called attention to the fact that he thought something should be done. The dentist said that the appearance of the radiographic

plate was caused by some condition or other, that both the medical profession and the dental profession were going crazy about the extraction of teeth, and as he knew the history of the case he did not think there was anything wrong with it. The physician insisted on another examination, and in spite of the fact that there was no history of trouble in that case, a teaspoonful of pus was removed when it was opened.

We have been a little slow, some of us temperamentally slow, to trust the findings of scientific instruments. We cannot afford to be in that attitude. No one in the dental profession, I believe, will ever advise the ruthless loss of teeth, but we cannot possibly avoid the fact that at the present time and in the past teeth have been retained by the advice of the dentist which were a menace to the health of the individual.

DR. GILMER (closing the discussion):

I wish to thank the gentlemen who have discussed my paper, and should have said nothing further had not other matters, not discussed in the paper, been brought out by those discussing it.

We must all recognize the fact that some physicians and some dentists are not students. We also recognize the fact that there are doctors and dentists who are faddists. Both will do foolish things at times. Such doctors and dentists, of course, may do much harm. The physician with little or no information in oral pathology, who sends patients to the dentist demanding wholesale extraction of teeth, believing that all obscure diseases for which he cannot discover a cause must be due to oral pathology, is capable of much harm. These are the little doctors. The better class of physicians do not decide these questions for themselves. They send their patients to dentists for oral examinations. They ask that radiographs be made, in order that unobservable foci in the mouth may be discovered. They have a right to demand that the dentists have sufficient knowledge to discover or exclude diseases of the mouth and jaws, as they have a right to demand similar information from the ophthalmologist or rhinologist in their fields. Another class of physicians shut their eyes to medical progress and deny that oral infection has anything to do with disease in other parts of the body. Likewise there are dentists who pooh-pooh the possibility of oral infections being injurious other than locally.

I know that physicians ought to know more about oral pathology, but, as said by Dr. Brophy, it is not necessary or possible for them to know everything about it, they must depend upon the dentist for special knowledge of jaw foci, and we must be prepared to co-operate with and help them.

I know the case that Dr. Noyes referred to and know the physician. This same physician sent a patient to me not long since for examination, who had neuritis which he could not account for. I had radiographs made and examined the patient's mouth. The patient had a twelve-tooth bridge on the upper jaw, which had been in use less than one year. It was a splendid piece of mechanical work and artistic in every sense. It was supported by six roots and radiographs showed each root carrying the bridge to be abscessed, some with a sinus, the others blind. The dentist who made that bridge must have been ignorant of the danger or was cruelly dishonest.



THE DENTAL REVIEW.

Devoted to the Advancement of Dental Science,

PUBLISHED MONTHLY.

EDITOR: C. N. JOHNSON, M. A., L. D. S., D. D. S.

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EDITORIAL.

G. V. BLACK.

There are epochs in the life of an individual, epochs in the history of a nation, and epochs in the development of a profession. It is quite within bounds to say that one of the greatest epochs in dentistry has occurred in the past fifty years, and the most important factor in that epoch was the man whose demise we are mourning today.

It is staggering to the senses to be obliged to write that Dr. G. V. Black is dead. He had been such an integral part of the profession for so many years that we had grown in the habit of thinking of Dr. Black whenever we thought of dentistry. In the splendid tribute which is published in this issue, written by his long-time friend Dr. Edmund Noyes, we get a glimpse of the many-sided character of the man, but no single article or single individual can do justice to the genius of Dr. Black.

He was the most scientific man the writer has ever known. He could not look upon any subject or any object in an ordinary or commonplace way, and he constantly saw things that the average individual entirely overlooked. Nothing was insignificant to him, however small; nothing was too great for his colossal comprehension. He was a rare example of the most simple and most profound in personality that ever could exist in a single individual.

He reveled in the prattle of little children, and was at home with the revolution of the planets. He saw farther, thought deeper, and executed more perfectly than is given to most men, and he had

the unusual faculty of making his ideas available for practical application.

As a scientist he was not merely the dreamer of dreams, but he wrought marvelously for the material welfare of the world. He was a seer at whose feet we all sat, and those of us who enjoyed the privilege of sitting there at will must miss him more and more as the months and years go by. We had become so habituated to looking upon every problem of our daily work in the light of what Dr. Black would think of it that now that the mentor is gone we shall be somewhat at sea.

But he would be the last to wish that we should be disheartened or lack in courage. Fortunately he left for us the essence of his best thought in his published works, so that for coming generations of dentists the benefaction of his service to humanity may go on. And in the aggregate what a service this was! In all the pages of dental history there is no more commanding name than that of G. V. Black, nor one that will live longer.

And it was not alone in the field of dentistry that his great genius was manifest. His versatility has already been mentioned, and volumes might be written on his attainments as a scientist outside of his profession. He was versed in the natural sciences, knew the heavens by heart, and could discourse entertainingly on astrology, zoology, geology or theology.

But it always seemed to the writer that his one overmastering passion was a love of nature as represented by the great out-of-doors. With all of his vast book knowledge he was essentially at heart a man of the wild. He loved the woods and the waves, and the creatures which in them live.

He worshipped at the shrine of the limitless forest and the winding stream; and the sweetest music his ears ever heard were the tempest tearing through the trees and the lapping of the waves along the pebbly shore.

In those last sad and waiting hours of his life as he lay, with his loved ones around him, when "Hope sees a star, and listening love can hear the rustle of a wing," he was heard to murmur the three words: "Trees—Flowers—Sky." And those were the last words he ever uttered.

The sage has gone. The intellectual giant is no more. We bow our heads in mute appeal to be made worthy of walking in the

footsteps of the master who has led the way. We bring to his memory not crape, nor clouds, nor dismal dirge. We wave a wreath toward the crimson west and on this wreath we weave the words:

"He is not dead whose glorious mind lifts thine on high,
To live in hearts we leave behind is not to die."

OBITUARY.

DR. GREENE VARDIMAN BLACK.

*A great man has gone; the greatness of Greene Vardiman Black, D. D. S., M. D., Sc. D., LL. D., is understood and acknowledged by the dental profession throughout the whole world, and because of his teachings and writings every intelligent practitioner of dentistry is doing many things better than he otherwise could have done them. Dr. Black died on Tuesday, August 31st, at Walnut Lodge, on the farm which he owned, and which had been his boyhood home. The cause of death was acute pernicious anemia, which had developed within five or six weeks previously. He had been spending the summer with his daughter and family in Duluth, Minnesota, and when Dr. Carl Black visited him there he found him failing rapidly, and at his request brought him back to the farm, near Jacksonville, Ill., where they arrived just two weeks before he died. For several days preceding his death all the members of his family were with him.

Dr. Black was born in Scott county, Illinois, near Winchester, Aug. 3, 1836. He was the son of William and Mary Black and a great-grandson of Capt. William Black, an officer of the militia in North Carolina just before the Mecklenberg rebellion, and one of the first officers to refuse to take the oath of allegiance to the British crown. The father of Dr. G. V. Black was born in Milledgeville, Georgia, in 1796. In 1825 he went to Tennessee and there was married to Mary S. Vaughn, removing to Scott county, Ill., about nine years later. After living for ten years in Scott

*The writer is indebted, for nearly all that is here presented, to the Jacksonville *Courier* for Sept. 2 and 3. The original source of much of the information being the report of the testimonial banquet in the DENTAL REVIEW for March, 1910.

county, where Dr. Black was born, the family removed to Cass county, settling seven miles southeast of Virginia, on the farm purchased by his father when Dr. Black was 8 years old and which has ever since been owned by the family, where Dr. Black spent his boyhood, and where he died. He purchased the farm from his father's estate about ten years ago.

At the age of 16 Dr. Black went to his brother, Dr. T. G. Black of Clayton, Ill., with whom he read medicine and for a time served as postmaster of the village. At the age of 21 he began the study of dentistry with Dr. J. C. Speer of Mt. Sterling, Ill. Afterward he established a dental office at Winchester, where he practiced his profession till 1862, when he enlisted in the Union army, 129th Illinois Volunteers. He held the rank of sergeant, and was most of the time on special scout duty. An injury to his knee put him in a Louisville hospital for six months, after which he was discharged for disability. In 1864 he opened a dental office in Jacksonville where he remained in practice till his love of teaching induced his removal to Chicago.

In 1860 Dr. Black was married to Jane L. Coughenmower, who died in 1863, leaving a son, Dr. Carl E. Black. In 1865 he was married to Miss Elizabeth Akers Davenport, who survives him, with two sons and two daughters, Dr. Carl E. Black of Jacksonville, Miss Clara Black of Chicago, Dr. Arthur D. Black of Chicago and Mrs. Mark Baldwin of Duluth, Minn. Arrangements had been made to celebrate the golden wedding anniversary of Dr. and Mrs. Black on Sept. 14th.

The funeral was at the house of Dr. and Mrs. Carl E. Black in Jacksonville. Dr. A. B. Morey, who had long been a friend of Dr. Black, was in charge of the services. Mrs. Genevieve Clark Wilson sang two familiar hymns. Dr. F. S. Hayden, dean of Illinois College, also an intimate friend, offered the prayer and read the simple burial service, and both Dr. Morey and Dr. Hayden spoke at some length in expression of the honor, esteem and affection in which Dr. Black was held by all who knew him, and in appreciation of his great services. The burial was in Diamond Grove Cemetery. The honorary pallbearers were Dr. Edmund J. James, president of the University of Illinois; Dr. A. W. Harris, president of Northwestern University; Dr. J. H. Kennerly, dean of the Dental Department of Washington University in St. Louis; Dr. C. R. E.

Koch, Dr. Edmund Noyes, and Dr. T. L. Gilmer of the Northwestern University Dental School, the latter an intimate friend of Dr. Black since the beginning of his practice. The active pallbearers were Dr. E. F. Baker, representing local medical practitioners; W. E. Veitch, representing the Jacksonville Literary Union; Dr. C. B. Sawyer, representing the Jacksonville Dental Society; A. T. Capps, representing the family; Dr. Geo. N. Kreider, long associated with Dr. Black; and Dr. Charles H. Rummelkamp, president of Illinois College. Floral tributes were of great beauty and in great profusion, sent from near and far. One from the Dental Society of the State of New York; others from all of the dental societies of Chicago and Illinois; from officers, nurses and alumni of Passavant Hospital; from the faculty, students and fraternities of the Dental School and the trustees of the university. The list published in the Jacksonville Courier is too long to be given in full.

A special sleeping car on the Wabash R. R. was filled with people from Chicago. Dr. A. W. Harris, president of Northwestern University, from the Dental School, Dr. C. R. E. Koch and Mrs. Koch, Dr. T. L. Gilmer and Mrs. Gilmer, Dr. Fred W. Gethro and Mrs. Gethro, Dr. H. A. Potts, formerly of Jacksonville, Dr. Geo. C. Poundstone, Dr. Geo. B. McFarlane, Dr. Edmund Noyes, Dr. M. M. Postle, Dr. R. E. Blackwell, Dr. Ernest Kennedy, Dr. J. W. Birkland, Dr. P. B. D. Idler, and students, Merle Black, a grand-nephew of Dr. Black, C. J. Erickson, and C. G. Shultz, Dr. J. G. Reid. Dr. J. E. Hinkins, and Dr. Edmund Noyes represented the Chicago Dental Society, Dr. F. B. Noyes and Dr. G. W. Dittmar the Dental Department of the University of Illinois. Others from Chicago were Dr. J. W. Ritter, Dr. Geo. E. Boxter, formerly associated with Dr. Carl E. Black, Dr. W. T. Reeves, Dr. Eugene McGinnis, Dr. Charles Baker. From Springfield there were Dr. and Mrs. Arthur Prince, Dr. G. H. Henderson, Dr. F. P. Donelan, Dr. J. J. Donelan, Dr. R. P. Booth, Dr. E. F. Hazel, Dr. Geo. N. Kreider.

Those who came from a distance were met at the station with autos and most beautifully taken care of and provided for during their stay in Jacksonville.

Eulogy of Dr. Black is unnecessary and enumeration of his services and writings is impossible. At a future time it is probable that some suitable memorial services may be arranged for, at which

time a biographical sketch may be presented of his life and services and activities in his profession, and outside of it, for his range of knowledge and interest was very wide and he knew well and could do well a wonderful number of different things.

It is proper here to mention two things concerning Dr. Black. First, he steadily refused to commercialize for his own profit any of his inventions or discoveries. The only income he received from his public service was his salary in the Dental School and that derived from the copyrights on his books. The other matter, which will interest his many warm friends and admirers everywhere, is the fact that notwithstanding the large amount of time and money that he spent in the researches and investigations that have proved so very beneficial to the profession, he never seriously neglected his practice but always derived income enough from it to provide for his family, and give his children a college education, and he left enough at his death to provide comfortably for those dependent upon him.

We may enumerate some of the events in Dr. Black's professional life. Joined the Missouri State Dental Society, 1866; joined the Illinois State Dental Society, 1868. First important dental paper, on "Gold Foil," read before the Illinois State Dental Society, 1869. This was the first scientific explanation of the cohesiveness or non-cohesiveness of gold foil, and has remained an unquestioned authority to the present time. President Illinois State Dental Society, 1870-1871. Invented one of the first cord-driven foot power dental engines, 1870. Lectured on pathology, histology and operative dentistry, Missouri Dental College, 1870-1880. First president of the Illinois state board of dental examiners, 1881-1887. Wrote book, "The Formation of Poisons by Micro-organisms," 1884. Professor of Dental Pathology, Chicago College of Dental Surgery, 1883-1889. Introduced teaching of dental technics, Chicago College of Dental Surgery, 1887. Wrote for the American System of Dentistry, chapters on "General Pathology," "Dental Caries," "Pathology of Dental Pulp," and "Diseases of the Peridental Membrane," 1886. Wrote book, "Periosteum and Peridental Membrane," 1887. Voted life membership in the Illinois State Dental Society, 1889. Professor Dental Pathology and Bacteriology, Dental Department, University of Iowa, 1890-1891. Wrote book, "Descriptive Anatomy of the Human Teeth." Wrote series of articles, entitled "The

Management of Enamel Margins," *Dental Cosmos*, 1891. Professor Dental Pathology and Bacteriology, Northwestern University Dental School, 1891-1897. Chairman of section on Etiology, Pathology and Bacteriology, World's Columbian Dental Congress, 1893. Report on Dental Nomenclature, World's Columbian Dental Congress, 1893. Wrote series of articles, entitled "An Investigation of the Physical Characters of the Human Teeth in Relation to Their Diseases and to Practical Dental Operations, Together with the Physical Characters of Filling Materials," *Dental Cosmos*, 1895-1896. Dean and professor of Operative Dentistry, Dental Pathology and Bacteriology, Northwestern University Dental School, 1897, to the time of his death. President National Dental Association, 1900. Awarded First Fellowship medal by the Dental Society of the State of New York, 1905. Special guest at annual meeting of American Dental Society of Europe, 1906. Wrote work on "Operative Dentistry," in two volumes, 1908. Testimonial banquet given by the Chicago Odontographic Society, 1910. Voted Miller prize for most valuable contributions to dental science and literature by the International Dental Federation, 1910. Wrote book on "Special Dental Pathology," 1915.

Dr. Black's titles are: D. D. S., Missouri Dental College, 1877; M. D., Chicago Medical College, 1884; Sc. D., Illinois College, 1892; LL. D., Northwestern University, 1898.

EDMUND NOYES.

BOOK REVIEWS.

PHYSIOLOGY FOR DENTAL STUDENTS. By R. G. Pearce, B. A., M. D., Associate in Physiology, Western Reserve University, and J. J. R. Macleod, M. B., D. P. H., Professor of Physiology, Western Reserve University. With 59 illustrations, including ten color plates, 320 pages. Price \$3.00. Published by C. V. Mosby Company, St. Louis, 1915.

It is high time that a special work on physiology was prepared for dental students, and so far as we are aware this is the only one of the kind in print. We welcome this volume to our library not only because it is the first of its kind but because of its intrinsic merits. Physiology is a fascinating subject at any time, it having been termed the poetry of the medical sciences, and this book is

made particularly attractive by the clearness of its style. There are two chapters of special interest at this time,—the one on “The science of dietetics,” and the one on “The ductless glands.” But it is misleading to particularize when the whole book is filled with entertaining and instructive matter. It should be read by dentists and dental students everywhere.

CORRESPONDENCE.

EDITOR DENTAL REVIEW:

Dr. Younger in his discussion of my paper on the treatment of pyorrhea, in the August number of the DENTAL REVIEW, does not quote me in full, and this would quite naturally convey an entirely different idea. I am quoted by Dr. Younger, page 820, as saying that “I had never been able to satisfactorily cure a case of pyorrhea by instrumentation and that the profession were abandoning that method of treatment.” If correctly quoted, I said, “there was a strong tendency on the part of the profession who aim to cure the condition by instrumentation to abandon the process as an *unaided specific treatment*.”

Dr. Younger is a star performer on instrumentation and I agree with what he says in this regard; however, he agrees with my contention when he mentions in his discussion that the patient that was treated by me at his office required other treatment in addition to instrumentation.

Respectfully,

J. P. CARMICHAEL, D. D. S.

PRACTICAL HINTS.

Edited by J. E. Schaefer, D. D. S.

(This department is for busy readers. We want short articles containing practical hints—the shorter the better. No article must exceed 200 words, unless of exceptional merit. Every dentist has some useful hint that has been of value to him, and if he will only put it in print it may be of equal value to others. That is what this department is for. Due credit will be given for every article sent. Address J. E. Schaefer, 1745 W. Harrison St., Chicago, Ill.)

Rubber Bowls:—If the upper part of rubber bulb of your chip blower wears out, cut the lower half off, which makes an ideal plaster bowl for small work, such as inlays and small bridges.—H. E. Bilser, D. D. S., Chicago, Ill.

To Relieve Plate Causing Irritation:—While the irritated spot on the membrane is readily seen, it is not always easy to locate it on the plate, especially the lower plate. Moisten a little whiting on palm of the hand, take a very little on a spatula, and apply to the irritated spot, place the plate in place and on removing it will be readily seen. Use small carborundum to remove.—*L. P. Haskell, D. D. S., Chicago, Ill.*

The Flat Lower Jaw:—The dentist who has not had the experience in his own mouth, of that problem of the mouth, the flat lower jaw, as I have had for twelve years, has not the least conception of what the patient has to undergo in becoming used to a denture on such a jaw. The result has been that I have learned some things which I could not otherwise have learned.—*L. P. Haskell, Chicago, Ill.*

The Dentiscope:—If your dentiscope burns out on a busy night, and you do not have another burner—don't worry, it can be quickly repaired. Take out the glass globe, turn on the power to the lamp and apply a bunsen or alcohol flame to the bars of the burner till it lights up. Turn off light and repeat; if your burner is not broken, just burned out, this method will give you a perfect light.—*Fred F. Schwartz, D. D. S., Chicago, Ill.*

Discoloration Due to Metal Posts:—A greenish discoloration of teeth bearing inlays retained by posts, or if roots supporting dowel crowns, may usually be traced to the employment of german silver or nickel alloy post material.

Teeth thus discolored are very difficult, if not impossible, to bleach, but the condition may be avoided by using 12% platinum clasp metal, or iridio-platinum wire for all posts.—*P. G. Puterbaugh, M. D., D. D. S.*

Preparation of Field:—The mouth should be thoroughly sprayed with some antiseptic solution and the point of injection thoroughly scrubbed with a solution of Tr. of Iodine and Tr. of Aconite, equal parts. The Iodine sterilizes the field and the Aconite slightly anesthetises the mucous membrane for the insertion of the

needle. Iodine does practically no good when used on any moist area, therefore dry the area first, then use the Iodine-Aconite mixture.—*F. R. Henshaw, D. D. S., Indianapolis, Ind.*

Extraction of Third Molars:—Third molars with no occlusion should be removed, providing there is a full complement of teeth in the mouth, and no loss of teeth anterior to the third molars, to prevent the second molars from decaying. I have observed these conditions in mouths and find that there are few patients where the third molars are thoroughly brushed, and on removal find that the contact of the third to the second molar has usually started to decay. So, by extraction, we eliminate decay by enabling the patient to brush the distal of the second molar and keep that area clean. If we believe in prophylaxis why should we leave the unclean third molar in the mouth to destroy the second molar beyond restoration.—*A. Brom Allen, D. D. S., Chicago, Ill.*

A Method of Treating Impacted Third Molars:—Where the impaction is not too deep, i. e., in those cases where one or more cusps have erupted they may be treated by the following method: Make a small opening in cusp (about No. 2 or No. 3 drill) to the dentine, make application of arsenic, covering carefully with oxyphosphate of zinc. In two or three days remove application and enlarge opening to the pulp, or as near as possible without causing pain. Make another application of arsenic, and leave until the pulp is dead (from three to five days is my experience). The mesial portion of the tooth can then be cut away, in fact, nearly the entire crown without much discomfort to the patient, and no laceration of the tissues. Often the pulp canals can be filled (their position is almost ideal), and the cavity margins smoothed with gutta percha so they will not irritate the gums. The tooth will work forward and should be cut off from time to time. Later it becomes a very simple matter to extract.—*Frederick W. Stephan, D. D. S., Chicago, Ill.*

Gold Fillings:—Gold fillings that possess both the good qualities of a gold filling and of an inlay are inserted in the fol-

lowing manner: Prepare the cavity in the usual way, outlined for an ordinary gold filling, and after thoroughly dehydrating with absolute alcohol and warm air, mix a small quantity of some good, quick setting cement and place on floor of cavity, gently packing into this small pieces of some fibre gold, Corona preferably, while cement is still soft. The gold should be gently condensed as the cement sets, and forced well into undercuts for the better retention of the filling, care being taken that no cement be allowed to remain on cavity margins. By using quick setting cement the operator may proceed with his filling with scarcely any loss of time for the setting of the cement. The cavity may be filled almost to margins with fibre gold and completed with gold foil if preferred. The cement serves to make an absolute air tight joint between the tooth structure and filling, thoroughly sealing up the dentinal tubule and reducing our percentage of leaky fillings. Since adopting this method some two years ago my percentage of failures with gold fillings has been reduced to minimum in comparison to what they were before.—*A. L. Rodgers, D. D. S., Athens, Ala.*

Preparation of a 2% Novocain Anaesthetic:—With synthetic or chemically prepared suprarenin hydrochlorid .00005 gm. in an isotonic saline solution makes an ideal anesthetic for dental purposes.

The Farbwerke-Hoechst Co. of New York dispenses Novocain-Suprarenin Tablets "E.," each containing Novocain .02, Suprarenin hydrochlorid synthetic .00005 gm., which are most convenient for use.

The above firm also dispenses a tablet called Ringer tablet which contains sodium chlorid 0.5, calcium chlorid 0.04, potassium chlorid 0.02 to be dissolved in freshly distilled water 100.00. One Ringer tablet dissolved by boiling in 10 c.c. distilled water makes an isotonic saline solution which is an ideal vehicle for carrying the Novocain-suprarenin compound.

One Novocain-suprarenin tablet "E." dissolved by boiling in 1 c.c. or sixteen drops of Ringer solution, makes a 2% Novocain, 1/1000 of 1% suprarenin hydrochlorid isotonic solution which is considered the proper strength for injection.

Jena glass dissolving cups graduated in cubic centimeters should be used for dissolving the tablets. The Farbwerke-Hoechst Co. has these cups on the market, one holding 10 c.c. for use in compounding Ringer solution and one 3 c.c. for dissolving the novocain tablets in Ringer solution.

It is absolutely necessary for the anesthetic to be neutral in chemical reaction, therefore the German Jena glass receptacles should be used on account of the solubility of American glass. American glass has alkaline salts incorporated in it, and these salts being soluble, thereby render the injection slightly alkaline in reaction if American glass containers be used.—*F. R. Henshaw, D. D. S., Indianapolis.*

MEMORANDA.

UNION MEETING.

There will be a joint meeting of the Adams-Hancock, McDonough-Fulton and Morgan County Dental Societies of Illinois, and the Northeast Missouri Society—to be held in Quincy, Ill., November 3, 4, 5. There will be something good every day including Drs. Moorehead, Roach and James of Chicago, Dr. George B. Winters of St. Louis, and Dr. Martin Dewey of Kansas City. Probably also Drs. Buckley and Konzett.

Plan now to attend. You can't afford to miss this. THE COMMITTEE.

NOTICE OF REGISTRATION.

TO ALL DENTISTS LICENSED IN THE STATE OF ILLINOIS.

You are hereby notified to procure from O. H. Seifert, Secretary of the Illinois State Board of Dental Examiners, with offices located at 305-6-7 Ridgely Bldg., Springfield, Illinois, a renewal of your certificate of registration to practice Dentistry in the State of Illinois from and after November 1st, 1915 and until November 1st, 1917, and that the fee therefor is \$1.00 (One Dollar), which must accompany the application for renewal.

You are further notified that unless you procure a renewal of your registration certificate on or before November 1st, 1915, your license to practice dentistry in the State of Illinois will be revoked in accordance with the statute in such cases made and provided.

ILLINOIS STATE BOARD OF DENTAL EXAMINERS.
O. H. Seifert, Secretary.

POSTAL SAVINGS SYSTEM.

INTERESTING STATISTICS SHOWING THE RAPID INCREASE AND ADVANTAGES OF THIS SERVICE IN CHICAGO—SERVICE IS HANDICAPPED

The popularity of the Postal Savings Bank among Chicago's foreign-born is forcefully brought out in statistics dealing with the nationality of postal savings depositors just compiled by the Post Office Department at Washington. On July 1st, the total deposits at Chicago amounted to \$3,267,532—a net gain during the fiscal year ended June

30th of \$961,600 or 42 per cent. The foreign-born own nearly three-fourths of the total deposits with \$2,348,160 standing to their credit. The accounts of American-born depositors total \$919,372. The Russians lead all other foreign-born depositors with \$518,502 to their credit; then follow the Austrians with \$337,737, the Germans with \$298,246 and the Italians with \$258,083. Representatives of every nation of Europe are among the depositors. One thousand five hundred and ninety-three depositors have reached the \$500 limit, and can deposit no more, despite their appeals to do so. Of this number 1,150 are foreign-born.

The postal savings service at Chicago has been seriously handicapped from the start by unfortunate restrictions in the original Postal Savings Act, which forbid the acceptance of more than \$100 a month from a depositor and fix \$500 as the maximum amount that may be accepted from him. The restrictions have proved particularly disappointing to the foreign-born, who often insist on depositing their entire savings at one time and can not understand why the United States Government, in which they have implicit confidence, is willing to safeguard a part of their savings and not all of them. Vast sums of money, earned by honest labor in Chicago, have thus been driven back into hiding and lost to local channels of trade.

In a recent report to the Post Office Department, Postmaster Campbell said:

"We have had numerous inquiries from intended patrons who desired to deposit more than \$100 each month and a great many who desired to deposit more than \$500 in all. These inquiries come principally from people who have sold real estate and are receiving more cash than can be deposited with us. Frequently patrons desire to deposit \$300 or \$400 or more at one time, and when they learn that they cannot do so, they are very apt not to start any account with us. They do not desire to deposit \$100 each month and keep the remainder at home."

URGENT APPEAL FOR A SPECIAL DENTAL HOSPITAL FUND FOR THE RELIEF OF THE
MANY SUFFERERS FROM WOUNDS OF THE FACE AND JAWS
SUSTAINED IN THIS WAR.

PARIS, August 2, 1915.

The terrible injuries to the face and jaws among the wounded in this war bring into evidence the usefulness of dental, orthodontic and oral surgeons. Medical hospitals, in the beginning somewhat reluctant to accept their services, become gradually more conscious of the aid that these members of the healing art can give. Of this they become conscious perhaps too slowly and if after twelve months of war which throughout Europe has resulted in 6,490,000 wounded* the help these can produce is not in accordance with the need, it is not the fault of the special surgeons just referred to who vigorously try to make a breach in ruling traditions. An example of a certain lack of interest in the work of these men, by the directors of general hospitals can be found in the words of a leading medical colleague who declared that it had been decided from the beginning, that no jaw cases should be treated in his hospital. This lack of interest—it is said without any antagonism—finds its origin, no doubt, in a too special interest that the general practitioner of the healing art takes in his own work, but it nevertheless exists and must be taken into consideration. It is a fact that can astonish only those who have forgotten the heroic but vain efforts of Harris of Baltimore—doctor of medicine as well as a practitioner of dental surgery—to obtain the co-operation of the general medical profession, viz.: the medical faculty of his city of that day (1839) for dental educational purposes.

*Official statistics of the War Office up to May 5, 1915.

The initiative of the American Institute of Dental Teachers to create "a fund to be given to the European Red Cross Dental Hospitals for the relief of wounded soldiers needing the services of dental and oral surgeons" represents an admirable movement by some of the most learned as well as practical men in the United States. *However, so far, no special Dental Hospital exists in Europe*, and this is a gap which our group wants to fill. Clinics, for lesions of the jaws, as a part of and attached to general hospitals or to dental schools, do exist, but so far no special hospital for dental and oral surgery.

According to modern calculations there are among French and Belgian soldiers alone up to May 5th, fifty-five thousand seven hundred and seventy face and jaw cases (55,770).* French warfare, exposing, as it does, the heads of the soldiers, is the cause of this considerable number. *Add to this that May 5, 1915; 13 per cent of which, according to a report in the Paris Academy of Medicine, are head wounds, that is 92,950. 60 per cent according to modern calculations are face and jaw wounds, that is 55,770.* To this should be added the number of German wounded in the facial region, prisoners in France, and English wounded of the same category as far as they are not sent to England. *the largest number of jaw cases treated in one of the clinics just referred to, up to May 24th in Paris was 193, and that we have three clinics of equivalent importance here, besides a few minor ones, as well as in the provinces, then one can form for one's self an opinion of the pressing need for special hospitals for dental and oral surgery.*

To join our group of specialists, we have asked a surgeon known for his capacity in restorative surgery (skin and bone grafting) to aid us and have been fortunate in receiving his acceptance. This is Professor Morestin, member of the medical faculty of Paris. Something we are sure his modesty wants to hide, but which we are proud to bring forward, is that he has recently been decorated for his services rendered to jaw cases. He is at the head of a special ward in the Military hospital of "Val de Grâce," also of one in "Rothschild's Hospital." Both these wards are full. In a week he estimates that a special hospital of 200 beds for jaw lesions would be filled. Therefore, he is of the opinion that a hospital of 500 beds would be desirable. It will be seen that the sum we ask for at the end of this article is not exaggerated. Since the beginning of the war the greater part of Professor Morestin's time has been devoted to "cleaning operations." He cleans the faces and jaws of the wounded in his ward of bullets, shrapnel, pieces of shell, etc., to reduce fever and so prevent death from septicemia. The restorative surgical, as well as the mecano-therapeutic facio-jaw work of numerous cases has yet to be done, now as well as after the war. Knowing how much better results are obtained from quick treatment of jaw lesions than after a postponed treatment when wrong lesions have taken place, the urgency of the realization of our efforts seems sufficiently obvious. This surgeon verbally says: "*The creation of a hospital for lesions of the jaws which are so frequent in this war, seems likely to render great service.*" Cognizant of this truth we have taken the initiative to endeavor to establish such an institution. Our efforts have so far met with considerable encouragement. To ascertain the official attitude, our organizing committee asked an audience with the French Minister of War and was very favorably received. The use of a building was voluntarily offered. Also we were assured that we could have all the help required for laboratory work. This work will be done by workmen, at present soldiers, who will be ordered back from the front for our purpose.

The committee was requested to organize the hospital at once to receive the wounded. We shall be attached either directly to the French Army Red Cross Society or to some other of the French Red Cross So-

*Number of wounded French and Belgian soldiers, 715,000 (War Office,

cieties. Other high officials have given moral support. We were received in special audience by the American Ambassador at Paris, who in a letter of sympathy speaks very favorably of the idea. However, in addition to this moral support, encouraging as it is, financial aid is necessary. Professional men are not rich and in giving their daily services without remuneration they are giving about all they are able to; yet to lead the way financially we personally began to form a little band, trusting in the ultimate co-operation of our brethren across the ocean. Together with an organizing committee of professional men, a financial committee consisting exclusively of business men has been formed, to be in accord with the French law on philanthropic institutions. *About twenty thousand dollars (\$20,000) is necessary to start a hospital of one hundred beds and run it for six months.* It does not seem a large amount when compared with the benefit and prestige that the profession at large, and especially the American profession, will derive from it. It is also our intention to invite colleagues, representatives of the different specialties of the healing art across the ocean, to come and help us.

Our urgent appeal now is this: *Could not every dental and oral surgeon and orthodontist or any other member of the healing art interested in our work in the United States ask one or two of his most devoted patients to give him some money for this hospital? Donations, large or small, will be gratefully received by any member of our group or may be sent to Messrs. J. P. Morgan & Co., Bankers, Wall Street, New York; to Messrs. Morgan, Harjes & Co., Bankers, 31 Boulevard Haussmann, Paris, as well as direct to our treasurer, Mr. Ch. Van Enter, 21 rue du Dragon, Paris.* The donations will be acknowledged in this journal with the names of the practitioner and his patient, in addition to which a proper receipt, engraved by a French artist, will be sent to each donor.

N. B. All donations should be designated "*For the American Dental Hospital of Paris for wounds of the face and jaws.*"

Members of our group:

WILLIAM J. YOUNGER, M. D.
JOHN H. SPAULDING, D. D. S.
I. B. DAVENPORT, M. D., M. D. S.
H. MORESTIN, M. D.
J. F. ANDRÉ BONNET, Ch. D.
FRANK W. WILLIAMS, D. D. S.
F. J. WILSON, D. D. S.
R. ANEMA, D. D. S., Sec'y.

CIRCULAR FOR THE INFORMATION OF PERSONS DESIRING TO ENTER THE DENTAL CORPS OF THE UNITED STATES NAVY

A candidate for appointment to the Dental Corps of the Navy as acting assistant dental surgeon must be a citizen of the United States, between 24 and 32 years of age, a graduate of a standard medical or dental college, trained in the several branches of dentistry, of good moral character, and of unquestionable professional repute.

Should an assistant dental surgeon, Dental Reserve Corps, desire to enter the Dental Corps, he must be between 22 and 30 years of age, a graduate of a reputable school of medicine or dentistry, of good moral character, and of unquestionable professional repute. In accordance with law, however, prior to being commissioned an assistant dental surgeon in the Dental Corps he must serve three years as an acting assistant dental surgeon, as explained below.

Successful candidates are first appointed acting assistant dental surgeons, and after serving a probationary period of three years are ordered before an examining board to determine their fitness for commission as assistant dental surgeons, United States Navy.

Applications should be made to the Chief of the Bureau of Navigation, Washington, D. C., via the Surgeon General, United States Navy, and according to the form prescribed. This application *must be in the handwriting of the candidate* and must be accompanied by the following certificates:

(a) Letters or certificates from two or more persons of good repute, testifying from personal knowledge to good habits and moral character.

(b) A certificate to the effect that the applicant is a citizen of the United States.

(c) Certificate of preliminary education. The candidate must submit a certificate of graduation from an accepted high school or an acceptable equivalent.

(d) Certificate of dental education. This certificate should give the name of the school and the the date of graduation.

(e) If the candidate has had special educational or professional advantages, certificates to this effect, signed by the proper authorities, should also be forwarded.

The applicant will save unnecessary correspondence if he will make sure when submitting his application that the qualifications enumerated above are clearly and plainly described in his letters or certificates.

FORM OF APPLICATION

(This form is not to be filled in here, but copied on a separate sheet in the handwriting of the applicant.)

.....
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SIR: I request permission to be examined for an appointment as acting assistant dental surgeon in the United States Navy. I was born at....., and was.....years of age on the.....day of.....191...; am a citizen of the United States, residing in....., county of....., in the State of..... I am a graduate of.....dental (medical) school, in the State of.....and was licensed to practice dentistry in the State of.....in.....

I forward herewith letters testifying to my moral character, habits, citizenship, preliminary education, professional education, and qualifications.

Very respectfully,

.....

The CHIEF OF THE BUREAU OF NAVIGATION,

Navy Department, Washington, D. C. (via The Surgeon General,
 United States Navy).

A candidate whose qualifications are satisfactory will receive a formal permit to present himself for examination.

THE EXAMINATION

When a candidate presents himself for examination he must bring with him the testimonials as to character and professional fitness, diploma of preliminary and professional education, and a certificate that he is a citizen of the United States; those forwarded with his application being returned to him for this purpose.

The examination is conducted in the following order: I. Physical. II. Professional. III. Collateral.

I. PHYSICAL EXAMINATION

The physical examination is thorough, and the candidate is required to certify on oath that he is free from all mental, physical, and constitutional defects. (Applicants are advised to carefully read the special circular re-

garding physical qualifications inclosed.)

Acuteness of vision, 12/20 for each eye, unaided by glasses, but capable of correction, by aid of lenses, to 20/20 is obligatory. Color perception must be normal and the teeth good.

If the candidate is found to be physically disqualified, his examination is concluded; if found to be physically qualified, his examination is continued as follows:

II. PROFESSIONAL EXAMINATION

1. Letter to the board describing in detail his general and professional education.

2. Tests of skill in practical dentistry.

3. Proficiency in the several usual subjects in a standard dental college course.

Theoretical (Written and Oral.)

Anatomy, physiology, histology, physics, chemistry, metallurgy, dental materia medica and therapeutics, dental pathology and bacteriology, orthodontia, oral surgery, operative dentistry (theory), and prosthetic dentistry (theory).

Practical (Clinical.)

Operative dentistry and prosthetic dentistry.

III. COLLATERAL EXAMINATION

This examination is oral, and is conducted in the following subjects: Arithmetic, grammar, general history, physics, general literature, and Latin.

Applicants holding diplomas or certificates from reputable literary or scientific colleges, normal schools, or high schools may submit such diplomas or certificates for the consideration of the board in this connection.

A successful candidate, upon completion of his examination, will be notified by the president of the board that he has been found qualified.

With the consent of the board, a candidate may withdraw at any period from further examination, and may at a future time present himself for re-examination. The board may conclude the examination (written, oral and practical) at any time, and may deviate from this general plan as it may deem best for the interests of the naval service.

No allowance will be made for the expense of persons appearing for examination.

The tenure of office in the Dental Corps of the Navy, except in the case of acting assistant dental surgeons appointed for temporary service only, is for life, unless sooner terminated by removal, resignation, disability, or other casualty.

All officers of the Dental Corps are retired from active service at the age of 64 years, and when so retired (or when retired from active service for disability or other casualty contracted in the line of duty before that age) receive an annual pay for life amounting to three-fourths of the pay of the grade or rank held by them at the time of retirement, including the increased pay allowed for length of service as explained below.

When an officer of the Navy, including dental officers, has been 30 years in the service, he may, upon his own application, in the discretion of the President, be retired from active service and placed upon the retired list at an annual pay for life amounting to three-fourths of the pay of the grade or rank held by him at the time of retirement, including the increased pay allowed for length of service.

Immediately upon official notification of the death from wounds or disease not the result of his own misconduct of any officer of the Navy, the Paymaster General of the Navy shall cause to be paid to the widow, and if

no widow, to the children, and if there be no children, to any other dependent relative of such officer previously designated by him, an amount equal to six months' pay at the rate of pay received by such officer at the date of his death, less \$75 to defray expenses of interment; and the residue, if any, of the amount reserved shall be paid subsequently to the designated person. No deduction shall be made on account of expenses of preparation or transportation of the remains.

When traveling under orders by other than public conveyance, officers of the Navy, including dental officers, receive 8 cents a mile to defray the expenses of such travel performed from point to point within the United States, and when so traveling abroad are allowed actual personal expenses estimated on a liberal basis in accord with the position of the officers, both as regards admissible items of expense and the cost of such items.

For every five years' service the pay of officers is increased 10 per cent (though not to exceed 40 per cent), calculated on the annual base pay of their grade, as shown in the appended table.

When an officer goes to sea or leaves the continental limits of the United States under assignment to stations or for the performance of other duties beyond the seas, his pay is increased 10 per cent.

When two or more candidates are examined at the same time, their appointments will be in order of merit reported by the board.

Officers of the Dental Corps have the rank of lieutenant (junior grade), and are entitled to all the military courtesies and consideration that go with that rank and are accorded to officers of other branches of the service in a similar grade. They wear the same uniform as other officers of the Navy, with a designating device distinctive of their corps.

PAY AND ALLOWANCE TABLE.

Length of Service.	Pay per Annum on Shore.	Allowances per Annum for Quarters.	Total Pay and Allowances per Annum on Shore.	Pay per Annum at Sea.
First five years' service....	\$2,000	\$432	\$2,432	\$2,200
After five years' service....	2,200	432	2,632	2,420
After ten years' service....	2,400	432	2,832	2,640
After fifteen years' service..	2,600	432	3,032	2,860
After twenty years' service..	2,800	432	3,232	3,080

A limited number of acting assistant dental surgeons are authorized by law for temporary appointment when their services are required. Their pay and allowances are the same as those of acting assistant dental surgeons in the regular service. The law provides that these temporary appointments may be revoked at any time, shall have no legal force or effect except for the time the temporary appointee is in active service, and shall include no right to retirement. The requirements for appointment are similar in general to those outlined above. Application for permission to take the examination should be addressed to the Chief of the Bureau of Navigation, Navy Department, Washington, D. C., via the Surgeon General, following the form given above.

The next examination will be held at Washington, D. C., on November 29th, 1915, and there are at present two vacancies in the Corps.

For further information address the Surgeon General, United States Navy, Navy Department, Washington, D. C.

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FRED W. MOWBRAY, Business Manager.

Sworn to and subscribed before me this 14th day of September, 1915.
(SEAL) MARGERY E. DIXSON, Notary Public.

(My commission expires November 17th, 1918.)

THE DENTAL REVIEW.

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CHICAGO, NOVEMBER, 1915.

No. 11

DISEASED TISSUES OF THE ORAL CAVITY.*

BY W. C. SMITH, D. D. S., EAST ST. LOUIS.

Gentlemen:

It was with great reluctance that I consented to appear before this Society and read a paper. In trying to decide on what to make my subject, this thought came to me: There are many diseased conditions of the soft tissues of the mouth of which I know little, and have been asked in consultation with physicians to see something that I should know about and find that I did not know anything; and, having had such experiences, I decided to get acquainted with such conditions and save myself the embarrassment of not being able to diagnose or suggest the etiology and treatment of a number of these diseases.

This having been my experience, I concluded there might be others in the profession who had devoted too much of their time to tooth troubles only; I have often tried to decide in my mind why it is that dentists, as a rule, confine themselves exclusively to tooth lesions. Is it because they are too busy and often too tired and worn out by the mental, physical and eye-strain during the day, to apply themselves at spare moments and at night, or is it the fault of our alma mater in not impressing upon our minds while in school the great importance of knowing how to diagnose and treat, or at least know what the trouble is and direct to the proper person for treatment, let it be to the physician, oculist, ear, nose and throat man, osteopath or what not? So, I say, I hope to be able at least to bring before you a few of the diseased conditions of the soft tissues in such a way that will help you to recognize them when you see them. It is a lamentable fact that the dental and medical professions were

*Read before the Illinois State Dental Society, May, 1915.

made separate professions, for it has been found in the last few years that the one needs the other, as the condition of the mouth has so much to do with the healthful condition of the entire body, as a great many maladies are traced to some foci of infection in the mouth; and vice versa, so many general systematic conditions manifest themselves in the mouth; hence the need of co-operation of the two professions. Why should the dentist be any less a general practitioner than the oculist, ear, nose and throat man?

The first diseased condition of the soft tissues we will consider will be that of the tongue.

Properly read, the appearance and superficial condition of the tongue is an index to most gastric and to many other general disturbances. In health it is of a delicate whitish pink color, smooth and moist. Any departure from this appearance indicates a pathological condition, not necessarily of the organ itself, but of others whose disturbed state is reflected upon the tongue, and especially of functional aberrations which interfere with digestion.

The indications upon the tongue of a dangerous condition are tremulous action, extreme dryness, blueness, a very red shining glazed aspect, and heavy furrowing of a dark or black hue.

Of itself, the tongue is subject to many pathological conditions, so we will note those of greatest interest to dentists.

GLOSSITIS

Glossitis, inflammation of the tongue itself, whether sympathetic or idiopathic, is a disease which may occur at any time. When it is the result of some injury or traumatism, it especially appeals to the dentist. The tongue may be wounded by the careless use of instruments and great inflammation may be the result. An excavator or burr that has been used in a gangrenous tooth pulp may wound the tongue and cause alarming symptoms as a result of septic infection; a very short time may suffice to cause such intense infiltration that suffocation will appear imminent. The swollen tongue may fill the mouth to the utmost point of distension. The general system may sympathize and pulse grow rapid. A feverish condition supervene and a state ensue that causes the most intense anxiety from the alarming

symptoms presented. An acute glossitis, however, will usually end in complete resolution without any such startling symptoms. It may be necessary, and is advisable, to administer an active cathartic and to promote diaphoresis by means of potassium bromid or Dover's powders with warm drinks. If there is a septic wound it should be opened to its bottom to permit escape of infectious products. If swelling assumes dangerous proportions, no time should be lost in making deep incisions into the body of the tongue. They should not be long and continuous, but merely deep punctures and as many as seem indicated.

Syphilitic ulcers, swellings, cracks and fissures, indurations, hypertrophies, etc., are quite common but we need not give them our attention at this time. Injuries from the teeth are not uncommon, and sometimes result in degenerative conditions of gravest character. The tongue is perhaps irritated by edges of decayed and broken teeth, and a thickening of the tissues with induration follows, even though the mucous membrane is not broken. The irritation being kept up, the scirrhus increases until there comes a time when it breaks down in the center, an indurated border yet remaining. When such a thickness is found, all sources of irritation should be removed, and if it does not disappear it may be necessary to remove it by surgical interference lest it assume a malignant form. If an eroded ulcer is the result of a sharp tooth, and upon the removal of the cause it present an indolent appearance, a chlorid of zinc wash, ten grains to an ounce of water, or tincture of capsicum in water should be prescribed. Violent surgical means should not, however, be lightly resorted to. Plenty of time should be given for Nature to bring about a cure, assisted by tonics and alteratives rather than too hasty local interference, lest we bring about a condition we desire to avoid.

In cases which develop gangrene, cauterization should be used. In addition to purely surgical treatment, antiseptic mouth washes should be used freely, together with constant cold applications to the tongue. Pain should be allayed by the use of morphin, etc.

In conclusion of this part of the paper I wish to review a case of Dr. Virgil Loeb, of St. Louis. Patient, W. O. A., white,

age, 50; first consultation Nov. 9, 1910; eleven days previous noticed pain in his tongue; he could locate it at no definite point, but said it seemed to be in the substance of the tongue.

The only cause he could give was that he was in the habit of whittling pine sticks and sticking the splinters in his mouth; thought perhaps he had scratched the under surface of his tongue. He had also been chewing some fresh perique tobacco. The pain became steadily more intense especially on the right side, and was more noticeable when swallowing. The patient was a well built man, robust, good color, with facial expression one of extreme uneasiness; physical examination negative; personal history negative, denied syphilis; examination of the mouth revealed somewhat inflamed mucous membrane and several carious teeth; the tongue apparently not swollen, nor was it especially inflamed. There was a small abrasion which was healing on the right side, otherwise it was apparently normal; temperature, normal; extreme nervousness; no nourishment for three days; pressure over right side of tongue caused excruciating pain.

Patient sent to hospital and cold applications to the throat and tongue ordered. Aspirin given every three hours, and that night slept fairly well. But on the next day, Nov. 10, after noon, pain returned with increasing severity. Larger doses of aspirin were given and veronal in 5-grain doses, with little relief.

On Nov. 12, for the first time edema around the orifice of Wharton's Duct was noticed, still no swelling of the tongue. By Nov. 13, a spectacular change had taken place in the tongue. It had become swollen until it filled the entire oral cavity; it protruded from the mouth; was very dry and hot; temperature 101; patient was semi-conscious; breathing very heavily; nourishment given by nasal tube, and water by rectum; a blood count showed 12,478 leukocytes; urine showed a large amount of albumin, hyalin and granular casts, and a few blood and pus cells. A consultation was held and an immediate operation decided upon. Tongue was anesthetized with application of cocaine, and aspirating needle was introduced to determine whether or not pus was present, and reduce pressure by bleeding. Needle was introduced ten times in as many different places but found no pus present. Bleeding was profuse. Patient put to bed and con-

tinued ice cold irrigation applied to the tongue. Patient had a most uncomfortable night, with severe pain which was relieved by a large dose of morphin. Patient better by morning and from this time began to improve; within four days tongue had reduced in size so that patient could talk and swallow fairly well; most pain now was due to ulceration caused by pressure on lower right and left carious teeth. From this time until the patient left the hospital, a period of two weeks, the treatment consisted of cold applications to the tongue and twenty-five per cent solution of argyrol applied to the ulcerated area.

CYSTS AND TUMORS, AND THEIR TREATMENT.

A cyst is a tumor containing a cavity or cavities filled with fluid or semi-fluid contents. In one sense, it is Nature's way of isolating from tissues any foreign or irritating matter. It is the only way extraneous substances can be permitted to remain in the animal economy. When cysts consist of a single chamber they are simple, and when divided by membranous septa are multilocular; should they contain teeth, they are called dentigerous cysts. A cyst may also be the result of a stoppage of some duct and consequent retention of the secretion of the gland of which it is the discharging canal; or it may be the mere collecting of a watery fluid in a previously existing serous cavity, the outcome of functional disturbance.

Cysts are divided into four classes. First, retention cysts, which implies previously existing cavities with the outlet stopped. Second, tubular cyst—dilatation of a functionless duct. Third, hydrocele cyst, which means a watery fluid in some serous cavity, one which has no discharging duct or opening of any kind. Fourth, glandular cyst—dilatation of certain glands.

Ranula is a retention cyst caused by the stoppage of Wharton's Duct, or one of the mucous glands beneath the tongue. The Latin is *Rana*, meaning frog.

Odontocoele cysts, or odontoma, is another comparatively common form of oral encystment. These are caused by the presence of undeveloped or misplaced tooth germs.

Treatment of cysts is usually quite simple. In most cases it is sufficient to open the cystic tumor and explore it for the presence of an irritating agent, remove contents and wash out

cavity with a weak disinfecting solution, when the whole should be packed with iodized lint. It might be well to wash out the cavity with some stimulating agent before using lint. In ranula, the obstruction should be, if possible, removed without cutting, that the course of duct may not be changed. Careful manipulation will usually drive the concretion, if not too large, out through the course of the duct and contents be removed by means of aspirator. Should the cyst again fill up, it may be necessary to open it, but the natural discharge from sub-maxillary should be carefully guarded and provided for. There are instances where it will be necessary to dissect out as much of enclosing membrane as is possible. There is little danger of bleeding in any operation upon the cysts if carefully performed, and the only complications are those arising from the ordinary inflammations.

THE TUMOR.

The term "tumor" implies an abnormal enlargement of a part from any non-inflammatory cause, but usually from a morbid growth, which in its structure conforms to a greater or less extent to the tissues in which it grows, and which has no functional action. Tumors may be of benign or malignant growth and are named according to the tissues in which they are found, or of which they are composed, viz.: fibroma, fibrous tissue; osteoma, osseous tissue. They are also named from other peculiarities, appearances and structural characters. Namely, sarcoma, meaning flesh; encephaloid, having the appearance of a head; myeloid, having the appearance of marrow. The dentist will be interested in the epulitic growths that are common in the mouth. The usual form of epulis is a vascular tumor that appears upon the gum. The term epulis meaning "Upon the Gum." Growths that sometimes fill the cavity of the teeth are true epulis, though of a simple character. For the removal of superficial and erectile tumors little more is needed than a ligature that will cut off circulation, with final cauterization of the place. An epulis with its origin in the pericementum of a tooth will be cured with extraction. But for those that penetrate the bone it will be necessary to remove as much of alveolus or even the body of the maxilla as is affected, remembering that the extremity of invasion must be reached and the wound properly dressed.

LUDWIG'S ANGINA.

In the third part of this paper we will speak of Ludwig's Angina, cause and treatment. Septic infection of the floor of the mouth and the neck are usually secondary to some infection in the mouth, nose or pharynx. And in many of these the teeth are the portals of entry. From the mouth, infection travels into the neck by two routes: One through the lymphatics, the other by extension along the cellular tissue planes; if it is an infection of the lymph nodes it is adenitis. If an infection of the cellular tissue planes, we have cellulitis, and often we have an infection of both. But if the cellular infection is so rapid, or so extensive, as to overshadow the lymph involvement, then we would have a typical clinical characteristic that is called "Ludwig's Angina," after the man who first described it. This is an acute spreading infiltration of the soft tissues, starting in the floor of the mouth and sub-maxillary region, which binds all the structures into a hard, board-like mass. The swelling is attached to the jaw bone on one, or both, sides and presses the tongue upward and backward into the pharynx. The roof and side walls of the mouth are unyielding, and any hard swelling in the floor must crowd the tongue backward. Though not very common, Ludwig's Angina is of great interest because in the past it has been credited with mortality of 40 per cent. Its existence as a definite clinical entity has been the subject of considerable discussion, but a number of cases have been followed so closely as to conclude it is as definite in its pathology and clinical signs as pneumonia or peritonitis. The trouble often starts in a sub-acute swelling which may remain indolent for some days or weeks, but when it becomes active the swelling spreads rapidly until the whole floor of the mouth and front of the neck may become involved. At first the skin is not red but pale and immovable on the sub-adjacent swelling and does not pit on pressure.

There is little constitutional disturbance, and though the patient will usually hold the mouth slightly open and may feel more comfortable sitting up, the respiratory impediment may go almost unnoticed. Within the mouth the induration may be felt in the floor on one or both sides, and the sub-mucosa may be so edematous as to rise above the level of the teeth in a gray roll. In this stage resolution may take place spontaneously, but more

commonly, if untreated, symptoms of grave sepsis develop and, if the patient survives long enough, there will be discoloration of skin with diffuse suppuration or partial gangrene of the deeper tissues. Pneumonia is not an unfrequent complication, and if swelling extends back into the pharynx, there may be edema of the glottis. Death in from 7 to 20 days is a frequent sequel of untreated cases. In February, 1909, before the St. Louis Surgical Club one was reported which started from an upper tooth, first involving the tissues of the head and face before reaching the sub-maxillary region. It is generally believed that this form of infection is usually due to streptococcus.

TREATMENT.

The safest treatment of all septic indurations of the floor of the mouth is early free incisions. Any particular induration might subside without incision, but one cannot tell which of them is the early stage of virulent infection. If the induration arises in connection with an infected tooth it is not always safe to draw the latter until inflammation has subsided. (Blair.) For a deep, extensive induration that can be felt from below the jaw, the incision is usually made best from outside. The skin is infiltrated with a one-fourth per cent solution of novocain and an incision is carried from the tip of the chin to the hyoid bone and from the latter point outward under the angle of the jaw as far as the outer margin of induration. The tissues cut as if they were frozen and bleed but little. The wounds are packed with gauze and are never sutured. Extreme restlessness may result from sepsis, but it is often caused by partial obstruction of respiration. If one is satisfied that respiratory obstruction is not from pneumonia, tracheotomy should not be delayed too long. These patients should have general supporting treatment and sleep.

In the last part of this paper I wish to say a few words about the most loathsome disease of the human body—syphilis, showing its manifestations in the mouth, and the care the dentist should take. I will not endeavor to suggest treatment, but will say that since we have a modern specific treatment for the same, there is no disease that responds so nicely to treatment. We will first speak of the general considerations to be observed by the dentist. The

introduction of syphilis in this paper may be considered out of place by those who advocate a restricted dental practice. But when we reflect that some of the greatest manifestations of syphilis are in the oral cavity, and remember that many of them are highly infectious, and that the danger to the dentist himself as well as to the succeeding innocent patients is extreme unless intelligent precautions are taken, the absolute necessity for a comprehension of the nature of the symptoms manifested becomes apparent.

The average dentist has heard and read of the fearful consequences that may be the result of operations for syphilitic patients, but he has not the knowledge that would enable him to recognize a case when presented, or to distinguish between such exhibitions of its virulence as are dangerous and those that are harmless and non-infective. He looks with suspicion upon any sore in the mouth and shrinks from a simple aphthous spot as he would from a pernicious mucous plaque. On the other hand, his ignorance may permit him to exhibit the most reprehensible recklessness, and not recognizing upon a poisoned instrument that which is deadly in its nature, carry infection to some innocent child and inoculate it for that which shall blast its whole future life. The introduction of the minutest amount of the discharge from a syphilitic sore in certain stages of the disease will inevitably produce the chancre which is the initial lesion. It may not mean the accidental puncture of a poisoned instrument, but any accidental sore, fissure or abrasion may afford entrance to this specific organism. Nothing short of a complete sterilization will insure absolute safety. Every dentist should have an extra set of instruments to use on the patients where he is positive. After such operation, such things as napkins, rubber dam, etc., should be burned, while everything else should be subjected to drastic sterilization. There are certain stages in which syphilitic discharges are quite non-infective, some in which chances of infection are quite remote, and yet others in which the slightest inoculation is positive and certain.

The oral lesions that are dangerous, aside from the primary chancre, which may appear upon the lips or in the mouth, belong to the secondary, the eruptive stage, and consist of the degeneration of mucous membranes and are analagous to those taking place on the skin. An eruption due to an identical cause may present a far different appearance on a mucous membrane from that ex-

hibited on the external cuticle; and in the mouth the variations are very much intensified by the secretions of the salivary glands and mucous follicles.

Syphilis may, or may not, pass through the two stages, primary and secondary. It is only when acquired by inoculation that syphilis presents all its characteristic phenomena; when it is congenital, that is, inherited from syphilitic parents, it does not pass through all its incubative stages, and is without the initial lesion. The primary sore or initial lesion, which is produced by inoculation with the syphilitic virus, is called the chancre. It is located at point of infection, but does not make its appearance until a time of ten to sixty days have passed. The primary sore presents certain characteristics which, while not affording a positive diagnosis as to its nature, yet when linked with the whole clinical history, should prevent error.

Dentists should be especially careful in their deduction and should not pronounce a lesion specific until so proven. It is a very delicate matter for a practitioner, to whom application for professional services is made by respectable persons in whose mouth or upon whose lips there exists a suspicious sore, to ask any pointed questions as to its origin, and yet, it is of the utmost importance, not only to the dentist personally, but to other patients that he should know the truth. Fortunately, it is not usual for lesions to make their appearance in the mouth until the existence of the disease is well known to the patient, and before that time arrives he or she has been under the care of a physician. Knowing the exigencies of the case, they will at once respond to guarded inquiries. The chancre, which is a positive indication of syphilitic poisoning, presents three distinguishing features. First, an incubative period—which is about twenty-one days. Second, certain special characteristic appearances. Some kind of a papilla or pimple situated at the point of infection and varying in size. It may never be large enough to attract special attention, but usually increases until as large as a dime. It is dark in color, elevated a little above the general surface, and is embedded in an indurated sub-cutaneous, infiltrated mass which, between the thumb and finger, feels like cartilage. After about ten days the epithelia upon the surface of the chancre softens and it becomes covered with a gray film. The central point ulcerates and discharges a serum

which is highly infectious. Third, soon after the appearance of the chancre, the nearest lymphatic gland becomes enlarged and indurated, thus indicating the beginning of the constitutional affection.

With the disappearance of the primary sore commences the second period of incubation, or that in which the virus is insiduously but steadily invading all tissues of the body. For the purposes demanded by the present, all syphilides may be divided into three classes: the macular (pigmented spots), second and third, the papular and pustular (pimples). In the mouth and in the mucous membrane the eruption is usually first seen in the macular form—that is, reddish or copper colored spots, not raised above contiguous surfaces. The papular form, which succeeds the macular, manifests itself on the skin as reddish pimples, but in the mouth assumes different characteristics. Instead of gradually becoming pustular, the surfaces are mascerated in the oral fluid and soon appear as erosions. During all this time the enlargement and induration of the lymph glands has been increasing and extending, and the constitutional disturbances begin to manifest themselves in fever, the temperature rising to 102 degrees and pains of neuralgic or rheumatic character, and severe headaches.

Recapitulation: It was necessary to investigate the pathological changes that take place in syphilitic affections before their manifestations could be comprehended or recognized when seen. If the nature of the syphilides are not learned, the dentist will not be able to understand their import when he meets them in practice, but it will be the oral manifestation or phenomena that will chiefly concern him. And hence these should be awarded special attention, because of the possibilities of the transmission of the disease through his instrumentality.

The practitioner has already been cautioned about jumping to the conclusion that every mucous patch in the mouth or every indurated sore has a specific origin. Any excoriation of the mucous surface may be greatly aggravated by special irritants that are common in the mouth. The chewing and smoking of tobacco, the holding of pipes, cigars and cigar holders, the drinking of hot and iced fluids, may intensify local irritation until it assumes a very suspicious aspect. In the same manner syphilitic sores in the mouth may take upon themselves an irri-

tated character or appearance; but it should be borne in mind that these aggravations do not in essence differ from the same morbid changes occurring in other parts of the body.

Chancres occurring upon the tongue or oral cavity, although somewhat modified by surroundings, present the same characteristics as when they appear elsewhere. Rough and carious teeth may aggravate them and modify their appearance, but they will not destroy their leading characteristics. As a rule, the lesions of the mouth are of a moist rather than a dry nature, and usually assume the form of mucous patches. In the early stages of secondary syphilis, the eruptions may appear in the mouth as well defined areas of a dark red color upon the soft palate, tongue, pillars of the fauces, and along the gingival labial borders, and will vary in size from mere points to blotches covering the whole surface. The papular syphilide of the cutaneous surfaces is represented in the mouth by patches of moist papules. The ulcerative lesions are usually the further breaking down of the mucous patches or gumma, and their deep erosions, until they form considerable caverns in the tissues, which are very painful. They may follow along the line of the tongue or they may burrow into the crypts of the tonsil, or form circular pits on the posterior wall of the pharynx.

An acute glossitis, or inflammation of the tongue, is not infrequently the result of syphilitic infection. Along the borders of the tongue dry or squamous lesions sometimes may be seen. They are not moistened by the usual secretions of the mouth, and in color are of a greyish or bluish white, sometimes having a glistening appearance. These patches are especially marked among users of tobacco, especially smokers, and are sometimes called "Smoker's patches," and are not always confined to the tongue itself, but may appear anywhere in the mouth.

Gummata of the mouth may develop in later stages of syphilis and give the characteristic "Toad's back" appearance. The syphilides of the mouth may assume a variety of forms, and sometimes their diagnosis is impossible except with the aid of their clinical history of syphilitic infection. They may possibly be mistaken for other infections. The roseola may be confounded with a follicular stomatitis, and the ulcers with

cancrum oris or noma. Mercurialization may usually be distinguished from syphilitic disturbances by the fetor of the breath and distinct metallic taste.

* * *

The only safe course is to group the various symptoms, examine for glandular induration, and carefully and delicately inquire into the history of the case, when suspicious appearances are found in the mouth, all the time observing caution to guard against possible infection. For if there happens to be, as is frequently the case, any abraded or wounded point in the fingers, it is possible for syphilitic incubation to take place from secreting mouth plaques.

My final plea to the dentist is, that when patients present themselves for services, that he make a thorough and careful examination for lesions of the soft tissues as well as tooth structures, that might be of an infectious nature, thereby protecting himself as well as succeeding patients from any infection.

A REPORT OF THE PROGRESS OF THE RESEARCH COMMISSION OF THE NATIONAL DENTAL ASSOCIATION.*

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The most significant thing in the dental profession today in my judgment is this psychological moment or age in which we are living, and I wonder if we, as a profession, appreciate the opportunities we have in living today. I am wondering if we really realize that we are the gatekeepers, if not the keepers of the gate, and by keepers of the gate I mean the gate to the grave, if we may judge from the literature that comes to us from many of the writers of today.

I wish to emphasize our present situation by contrast and I want you to go back with me just a few hundred years and see a band of men and women driving children with switches to the tomb of St. Vitus to be cured of St. Vitus' dance, some of them driven one hundred miles, two hundred miles, made

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to limp and trudge and force themselves along over that weary road. Why? Because they had infection in their system which was affecting their nervous organization and which was very liable to affect their heart. How well we know that the infection may express itself in the human organism in various ways, but in this instance as St. Vitus' dance or chorea. Maybe the next week it expresses itself as an endocarditis. Those children I have referred to should have been put to bed and kept quiet, but instead of that they were whipped over those roads to the tomb of St. Vitus to be cured.

I want to give you another picture. It is in Genoa. One day a man walked along the roadway, he had a writing quill and got ink on his fingers, and he rubbed the ink off on a wall and he was seen. What a terrible thing he had done. That community believed that an epidemic of disease was caused by a man who was possessed of an evil spirit; that by rubbing or smearing the walls with an unction he contaminated the whole community, and if they could find that person they would stamp out the disease and the great epidemic would be stayed. A woman saw him, in the act of doing it, from a window and the man supposed to have been spreading disease was caught. They tortured him. They asked him where he got the unction, and in his awful agony he told them he got the formula from an apothecary store at the corner, and they went to the apothecary, and the druggist implicated others until five thousand people were involved and put to death, and the home of the druggist was torn down and a great monument was built in its place to warn others.

Within the history or lifetime of the great grandfathers of dentists in this room, in Salem, Massachusetts, the lives of twenty people were put out because they were thought to be witches and disturbers of the community. What was it? Nothing but hysteria. Today we think that is tragic, don't we? When we look at the progress of the past centuries, and when we open the door of the future and see the writing on the wall that indicates what is possible in the next fifty years, we are led today to think that we are relatively not so much more civilized than those people as we think.

I want to emphasize again that this is one of the psychologi-

cal moments in the history of the dental profession, because never before have all the leaders of the healing art looked to us as they do today for the solution of problems which we are more competent to get answers for than they. "The question is, will we do it?" Have we realized that the great scourges that took off thousands and hundreds of thousands of people, amounting to sixty millions of people with one disease within a hundred years in Europe, have been stayed? The great masses of people are not dying today of typhoid fever, of diphtheria, of yellow fever, of cholera, of smallpox. Why? Those infectious diseases which kill quickly are understood sufficiently today so that we can quarantine them and prevent their spread.

The life rate has changed within fifty years, so that in this community, instead of fifty people per thousand dying every year, there are probably less than fifteen. What has brought that about? The elimination of the infectious disease, the contagious diseases, as we call them. Of what are people dying today? Dr. Mayo is authority for the statement that probably not ten per cent of the people today die a physiological death. How do they die? From some of the chronic disorders we say. What are they? Bright's disease, heart disease, liver disease, gall-stones, or we may use the later name of cholecystitis. But when we come to analyze these various affections and come right down to the basic principle we find that these diseases are largely symptoms.

Last week at our State Medical Society meeting in Ohio, one of our leading internists made the statement that we must drop from the literature such words as dropsy as a disease, gall-stones as a disease, or peptic ulcer as a disease. Why? They are only symptoms of disease. They are not diseases. What is a disease? A disease is generally that condition in which some particular tissue or organ is affected; there has been blocking of a very small blood vessel by the driving of organisms through the circulation, and that particular blocking has produced a reaction in that organ which we call a nephritis, or a cholecystitis, or a peptic ulcer, or even hardening of the arteries, according to the organ or tissue. Is that based on fact? If so, it is one of the most tragic things and one of the most remarkable things for us to consider as a dental profession

today, for it puts us in a position of being not only guardians, but we are in the position of having the first opportunity of diagnosing conditions as soon as we see patients before they are seriously afflicted with these disorders. Let us take some heart infection as endocarditis. The latest histological and pathological work on etiology of heart valve infection indicates that the lesion is not caused by the organisms which were drifting through the blood stream and bathing the heart valve and clinging to it as they passed, but these organisms passing through a small blood vessel at the base of the valve and cutting off nutrition to the valve, and the little vessel ruptures, with granulations extending over the margin of the valve in consequence.

Let us take as another instance the modern conception of hardening of the arteries. When we come to study that from a histological and pathological standpoint we find it is not a hardening of the entire orifice, a hardening of the blood vessel, but it is a series of discs, and each one of these discs has as its central point the beginning of calcification, due to a rupture in one of the capillary blood vessels surrounding the main artery, and which was caused by an embolus due to a drifting of the organisms in the system. We could go through a whole series of what we call the chronic disorders. We find that every one of them has as its first expression a blocking of a capillary.

Another significant thing, and I put it under four heads, is the fact that organisms have a selectivity for tissues, which is one of the greatest discoveries of modern times. Again, we have to thank Dr. Rosenow more than anyone else for the establishment of that fact. I will not attempt to go into details because you are familiar with them. I will say this, however, that a certain strain of a given organism will have an appetite or an affinity for a particular kind of tissue and as it goes through the body it may or may not block. If it does not get a foothold it is because its appetite is not for that particular tissue. Therefore, a particular strain that produces an inflammatory process in a joint continues to do it so long as it is of the same strain and may pass through the liver or stomach, the arterioles and capillaries, and not produce a lesion because it has no affinity for that particular kind of tissue.

The next very important point is that the organism of a given species may change in type and specificity, so that it will today attack a heart valve or a knee joint. We may have a typical joint type of infection, and in a month from now the organisms may manifest an affinity for some other kind of tissue, or a year from now still another kind, so that we will have developing in the same patient four or five different expressions of disease from this one organism. Take with that the other thought I wish to mention—I will not undertake to establish it because it has been established, namely, these chronic disorders are largely the result of a focus of infection which may themselves be very slight, but there is a definite focus of infection in some part of the body, and of all districts of the body where a focus of infection is likely to occur the mouth seems to be universally the most common and the most frequent. Where does that put the dental profession today?

We find, as was expressed in the meeting I referred to, the medical profession are placing the question of diagnosis of an arthritis in the hands of the dental profession which means that you will see these cases years and months before the physician, and the dental profession must learn to observe the first symptoms of enlargement of the joints, and immediately recognize the significance and look for the focus of infection, immediately eliminate it if possible, and save the patient from these grave joint disorders which come from a deforming arthritis, because after it has established itself with secondary foci in the joints, it is almost impossible to remove it, to correct it, and cure it, although the primary focus has been removed. Then it becomes necessary for the dentist not only to recognize arthritis, but to recognize the symptoms by questioning in regard to a large number of those chronic disorders from which people suffer before they are serious enough to have consulted their physicians about them. How are we going to do it? There is only one way, and that is to know the symptomatology of these chronic disorders. In the second place, we should know the pathology of their development, and, in the third place, we should know the relation of that pathology to the focus of infection and recognize and differentiate the various types of infection of the mouth and know which one is

probably related to them. In my judgment, there is no question brought to the attention of the dental profession today that is more urgent than that of the problem of differentiation. I shall not refer particularly to the discussions of this afternoon, although they demonstrate it, but it is true that every discussion that I have heard for some time has brought up the question of septic infections without differentiating between the different types of infections, and without really having a basis for differentiation, for we have not yet the knowledge, and yet it is very clear that it will be possible in ten years from now. We will be able to differentiate the different types as we differentiate the degrees or types of infection of what we term pyorrhea alveolaris, or whatever you choose to call it. The point I want to emphasize is that to get that information, and to do so as a dental profession we must become students. I would like to go into the progress that has been made toward differentiating these infections, but I can hardly do so at this time. What has this got to do with this scientific research commission? There are enough eminent pathologists to study the great problems of pathology, and enough bacteriologists in the medical profession to solve the problems of bacteria in the mouth. What do we need special research for? We have only to look at the literature today to see that we need special dental pathologists and bacteriologists. How are we going to get them? We must train them. How are we going to train them? We must support them while they are getting their training. We must give them an opportunity to get special information along our lines. The development of pathologists and bacteriologists is an example of what the Research Commission of the National Dental Association is undertaking today. This commission is composed of twenty-seven men, twenty-five of whom are elected by the trustees of the National Dental Association, and not more than two of whom come from any one state. Two of them are the president and secretary of the National Dental Association. This commission has an *ad interim* board known as the executive board of five, which carries on the active work of the commission. That commission is given the responsibility and opportunity of raising funds for carrying on research work, of organizing researches, of selecting men who are

competent to undertake research work, and placing in their hands not money to pay them for doing research work, but money with which to hire technicians for enlarging their output, and to give them more hands to work with, more eyes to see with, and more fingers to manipulate with, to enlarge the number of men who are engrossed with work which they are doing through their own devotion, but whose limitations make it necessary for them to sacrifice their health to get out a small quantity of work.

The commission has also the responsibility of training research workers, and we are undertaking today to select men who will be ultimately competent, and in the meantime placing them in an environment where they will get such training as will eminently fit them for this work.

The dental profession will have by next September a metallurgical and electro-chemical engineer who will be available for all scientific metallurgical problems of our profession, who will devote his life to this work unless some big corporation succeeds in buying him away from us. That man is getting a salary of \$110.00 per month while doing our metallurgical research work, and the University of Michigan is going to grant him, Mr. Fahrenwald, the degree of Doctor of Philosophy for the work he is doing along the lines of metallurgy and chemistry. I want to say that kind of preparation is the only kind that we know of that will ultimately make a man large enough to solve these problems. Men who are compelled to work from morning till night to earn their bread and butter for their wives and children cannot work at night and do this research work to advantage. You know it cannot be done. We are taking up the subjects of bio-chemistry and biology, metallurgy, bacteriology and physiology, and I think ultimately, in five or ten years, we will not have to go to the medical profession for competent men to work out these problems.

You are familiar with the work that has been done, for instance, by Dr. Hartzell. For those who are not familiar with his work, I will say that Dr. Hartzell last year had two men assisting him in studying the relations of mouth infections to arthritis particularly. This year he has three assistants, one simply a chief technician, another a dentist, working as an in-

terne in the hospital, and a bacteriologist. But it is necessary for a man like him or any other man directing researches to have sufficient help to do the detail work so that he himself can direct a large quantity of it. You are all familiar with the fact that the work of Dr. Hartzell in relation to mouth infections has paralleled the excellent work of Dr. Rosenow, and has duplicated some of it from a particularly important dental aspect. I also want to state that Dr. Hartzell did that work under the advice of Dr. Rosenow, who was in conference with him. It was not simply the case of duplicating work, but it was developing the necessary dental phase of it. The effect of that work has been very beneficial. When Dr. Hartzell's work was demonstrated last year before the American Medical Association I had the privilege of having charge of the exhibit in the Scientific Exhibit of the A. M. A. Members of the American Medical Association looked at this exhibit along with the others that we had, and said there was more in this one exhibit to show the medical profession what the dental profession can do than has been done by the Stomatological Section of the American Medical Association in the twenty years of its existence. (Applause.) I do not say that to belittle the work of the Stomatological Section, because I admire the men in that section and the work they have done. This exhibit made such an impression that it gave us a standing invitation hereafter to make a scientific exhibit.

I might take a good deal of your time in giving you the details as to the work that has been covered and the success accomplished by these different men, but I will only emphasize two or three new and important things.

I would like to call your attention first to the places in which the work is being carried on this year. I have spoken of the work done in the University of Minnesota, and the University of Minnesota hospitals and their medical staffs are giving us splendid co-operation. The president of that university is doing all he can to aid us so that our men may work to the limit of their capacity in carrying on these researches.

We are also carrying on splendid work in the University of Illinois under the direction of Dr. Fred B. Noyes. There is no

other guarantee necessary because of our confidence in his ability and in his work.

It is a matter of very great satisfaction to the commission that they have been able in a small way to strengthen the work of our adored father of the profession, Dr. G. V. Black. (Applause.)

The commission is also carrying on work in the University of Columbia.

The dentists of New York City and state have been giving splendid support to the work of Dr. Gies for some time, and our commission has united with them in support of his work. We hope to be able to enlarge the work.

The Research Commission is assisting Dr. Russel Bunting in the University of Michigan on the problem of dental caries, and Dr. Marcus Ward in the same institution on the study of cements.

The research department is giving support to the solving of metallurgical problems, and I think I am justified in telling you that one-third of the platinum used in the world is used in the practice and art of dentistry, and do you realize that for the dental profession it amounts to \$2,500,000 annually. If we would utilize the opportunity and the information we have on the tungsten product which has been developed through our Research Commission, it would result in great benefit and good to the dental profession. This metal is six times as strong as iridio-platinum; it has a melting point nearly twice as high as that of platinum; its elasticity is twice as great as that of steel. It has a hardness so much greater than that of steel that the management of the General Electric Company is responsible for the statement that one tungsten point will outwear two hundred steel points. It is a metal that does not lose its elasticity when you heat it. This metal is available for any man in this room for use in making posts for crowns and for casting bridges upon. It is so stiff and rigid that you can make a framework of it and cast about it and control the contraction that will take place in casting a bridge with its abutments, all at the same time. You may use it for orthodontia appliances either by the

method which has been presented by Dr. Robinson or by the standard methods.

Relative to the application of the metal in orthodontia appliances, I am advised that it is destined to supplant largely the metals that are in use up to this time for orthodontic work. With its greater elasticity, you can make attachments to it with hard gold solder. It has the property of enormous strength; it does not break off like clasp metal wires by crystallization. You may use wire that is so much smaller that it seems incredible for it to accomplish the work it does.

Any dentist who will write to the commission can get the metal. We are furnishing it to the profession at what it costs us to produce it, and ultimately the manufacturers will make it. The selling price is virtually one-sixth of that of platinum for the same weight.

In the last two or three months our research department has been able to furnish the profession enough tungsten to supplant the use of platinum to go far toward paying for the research expense that the commission has gone to for that particular line of research work. (Applause.)

There are only a few who know about it because you have not read the recent issues of the *Journal of the National Dental Association* with reference to the research work we have been doing in regard to this metal.

As to palladium, it requires no special preparation. Any man can send to the American Platinum Works, New Jersey and buy palladium for \$48 an ounce. You can get twice the bulk for the same weight that you can with platinum. You can make it equivalent to platinum at \$26 an ounce.

I might spend considerable time in detailing some of the work the research commission is doing with regard to these metals, but I shall not do so.

As to the progress that is being made in differentiating certain organisms and certain infections of the mouth, and particularly the problem that is paramount today as to whether or not the endameba is the etiological factor in pyorrhea alveolaris, and whether emetin is a specific for this disease, I am in a rather embarrassing position in that I must refer to the researches I have been directing myself. In a word, let me say that there

are four strong arguments in favor of the assumption that pyorrhea is caused by an organism known as the *endameba buccalis*, and they are these:

1. The statement of bacteriologists who have national and international reputations.

2. The finding of that organism in large numbers, if not in a large proportion of the pyorrhea pockets, meaning all pyorrhea pockets from which there is pus in sufficient quantity to be seen with the eye.

3. The inference based upon the fact that since the amebic dysentery of the warm countries is caused by the ameba *histolyticus*, and since that organism is destroyed and the disease cured by the injection of emetin, they have assumed by inference, let me repeat, that this infection of the mouth is caused by the *endameba buccalis*.

4. The testimony of a great many men who are using it.

I have given four arguments for, while there are over twelve almost unimpeachable arguments against those that have been advanced. It is rather significant that bacteriologists, with the exception of Dr. Barrett, who have made the bold and strong statement relative to the specificity of the *endameba buccalis*, have been working in a purely medical field. They are not dental bacteriologists and dental pathologists, so that over against my first argument we have still a larger number of pathologists and bacteriologists from the dental profession who are not ready to assume that this organism is the cause. I will not enumerate the whole twelve arguments, but simply give the effect of them. The inference that *endameba* causes pyorrhea, and since emetin cures amebic dysentery, it cures pyorrhea, is met by this argument. If emetin has a beneficial effect in pyorrhea treatment, it is not demonstrated at all that it is because of its effect on the *endameba*, because in the cases we have tabulated, and there are a large number, where the emetin has shown a beneficial effect, and where that treatment is started in December and January and continued into February and March, those pockets that did not show *endameba* when the lesion was first examined and during the early stages of the treatment with emetin, have an abundance of the organism after the spring months, even in March and April. That is a most formidable

argument against the theory that the endameba buccalis is the sole cause of pyorrhea alveolaris, because if emetin is going to be efficient as a remedy the endamebae must not increase in number. There is still another reason, and almost no account has been taken of this, namely, that emetin is almost as certain and as important a bactericide as it is an amebicide for certain microorganisms in the mouth, and this you can readily demonstrate for yourselves if you take half a dozen culture tubes and open them to the air and in two or three of them put a loopful of emetin to every five c.c. of culture media. Those test tubes that have no emetin will be cloudy in twenty-four hours from the bacteria that come in with the air, and those that have emetin will be clear.

We might consider the effect of emetin on the pathogenic organisms of the mouth, the typhoid bacillus, the colon bacillus, the diphtheria bacillus, a number of non-pathogenic organisms in the laboratory and hospital air, so that we are not justified in assuming that if emetin is beneficial its good effect is due to its action on the endameba. The observations of the men who are making careful studies would seem to establish very clearly that the treatment with emetin is rarely beneficial further than the temporary abatement of the total quantity of pus flowing, and only largely beneficial in those cases in which there is an abundant flow of pus. Since emetin is only applicable, or beneficial in that type of case, what about the etiological factor that goes back of the time when the pocket was secreting pus?

The letters we have been receiving from various parts of the country are interesting and instructive. One of the most important functions of this commission will be and perhaps has been to establish a course of correspondence in various parts of the United States. At the present time, our research department has nearly two hundred and fifty correspondents as dental observers. We have the presidents of the various state societies, and from six to ten men selected in each state by the presidents of these state societies and the members of the commission. We have slides prepared for use from all parts of the country, from Canada, Mexico, South America, Porto Rico and Cuba, and it is interesting to find that the endameba buccalis is not present in all these communities universally, and it is not always pres-

ent in the cases of pyorrhea alveolaris which we see in Cleveland.

The correspondence of these men is significant because it shows the importance and skill of careful observation. For instance, one man writes that he has been using emetin for two weeks during which time he has treated sixteen cases, and has had five absolute cures. (Laughter.) Another man writes that he has treated now sixty cases, with only one failure. Over and against that we have a larger mass of correspondence from men who are competent to judge, and the sentiment of the large bulk of them is to the effect that they have found practically no beneficial effect from the use of emetin unless instrumentation has been a part of the treatment. (Applause.) We find still another large group of men who say that emetin has apparently a definite beneficial effect which they cannot understand.

It would be interesting if we could take the time and analyze all of the replies that are favorable and unfavorable. In brief, only eleven per cent of the replies received were favorable to the use of emetin; forty-seven per cent were unfavorable, and forty-two per cent. were noncommittal.

Another important thing I want to emphasize is that emetin may have a very much greater significance for us eventually than the one that has been given. You are familiar with the fact, for instance, that when quinin is injected into the circulation of a patient who has malaria, it is a specific for that disease, and it kills the organism if it is injected at the right time. You are also familiar with the effect of salvarsan or what is known as 606. Here is one of the most profoundly significant things in the whole situation: Emetin apparently is but slightly injurious to the body itself, when injected in the quantities we may use. Its effect on certain bacteria that we know are pathogenic is simply marvelous. Those of you who are treating cases of pyorrhea know that occasionally you will get a patient in whom you cannot treat more than half of the teeth in the mouth at one time without that patient having a severe reaction the next day. You will see it. If you undertook to scale all the teeth of such a patient at one sitting, that patient would be made profoundly sick the next day. Why? We use words sometimes to signify that which we do not know. One of them is that we

say these patients are suffering from bacteriaemia. What do we mean by that? Do we mean the organisms have gone all through the blood, or do we mean the products of those organisms have gone through the blood, or do we mean that we have liberated certain forces of the body itself that have been able to split up proteins that constitute these bacteria, and by splitting them so rapidly our body is poisoned?

There are certain cases that respond to emetin treatment not a large proportion of cases. This is precisely as certain cases respond to instrumentation. What takes place? From the observations we have made in our research work we have found that the injection of emetin causes an immediate change in the phagocytic power of the leucocytes. If you will take a microscope when you go home, and note one of these typical cases, you will find the leucocytes you take from a pus pocket before you use emetin, even without instrumentation, will show a given proportion, which will be a small number of ingested bacteria. If you inject emetin today and more after tomorrow, you will notice a more pronounced condition. You will find the phagocytes have taken up a larger number of bacteria. How do they do it? Metchnikoff gives us the wonderful and beautiful theory that the leucocytes gather up the bacteria by throwing out pseudo-pods. I have never seen them do it, although I have watched that process by the hour. A later theory of phagocytic action is that the leucocytes take in bacteria because of the sticking substances they have on their surfaces which hold the bacteria they come in contact with. The bacteria themselves have a sticky quality to their surfaces and what emetin seems to do is to produce in the blood that very quality. Note this parallelism; succinimid of mercury has been found to produce almost the same effect on pyorrhea infection that emetin does, and that was found accidentally, and it produces the same reaction. It has been found that emetin seems to be almost a specific in many cases of the condition which we know as psoriasis which has never been suggested as being an infection due to the amebas. Literature has accumulated rapidly to demonstrate that emetin has an action entirely apart from its amebicidal action, hence its beneficial effect in these cases.

We find in tabulating the temperature curve for November, December, January, February, March and April, that there was a definite relation, in Cleveland, at least, of the presence of endameba to the mean temperature, and frequently after there was a rise in temperature in January or February; the day after that rise we found spores in the mouth, and on the second and third days we find the motile organisms. A significant thing happened. After two or three of these series had followed, we wrote to one of our friends about it and he found the same parallel in his climate, though he had attributed it to less and more favorable cases. In Cleveland, at least, the presence of endameba seems to be very easily influenced in the winter months. It has been easy to understand why in New Orleans they can find the endameba all winter long in every mouth. When you get the next issue of the *National Dental Journal* you will find by the rise in the temperature curve there are twice as many endameba in mouths with no pyorrhea in April as are found in mouths with pyorrhea in January.

I am not going to point out to you the rest of the twelve arguments against amebic infection. I want to speak of one other important thing in this connection, and that is our responsibility in differentiating the various types of infection of the mouth. We are not justified, I think, in making a statement relative to the probable effect of an apical infection or gingival infection since the type of infection itself may vary through a very large range. When we get our microscopes and study carefully the type of organism in these cases or in others, we may find they are similar or the same, but, as a matter of fact, when we study the disease-producing effects of the organisms they are different, and one of the most valuable ways is to study the same organisms as we get them from different pockets, with a motion picture. We may find it different. It has different motility. It has a different characteristic of motion according to the condition of the infection from which we have taken it. This will give us ultimately some distinct benefit in differentiating these infections.

I want to pass quickly to the group of organisms known as the streptococcus and pneumococcus group, assuming you are familiar with the facts that they have been demonstrated to be related to the rheumatic infections, such as inflammatory

rheumatism of the joints, certain types of deforming arthritis, endocarditis, myocarditis and pericarditis, cholecystitis, peptic ulcer, and there are a few others we could name that have not been definitely related, but perhaps are.

I know of no better way than to give you the history in very brief form of the development of the symptoms in the patients themselves. In that way you may acquire information more quickly.

There are a series of affections, which may be infections, that are now not classified as chronic disorders, expressing themselves as headaches, malaise, perhaps some digestive disturbance, more or less lassitude—those definite local symptoms which are related to the liver, to the stomach or to the nervous system.

I want to speak of that particular type that expresses itself as headache. We have not appreciated the fact that many people are subjected to a swarm of infections periodically. I believe we have demonstrated the fact that certain people who have recurrent headaches have at the time of these recurrences a swarm of infection by certain organisms. You may not be able to demonstrate them by taking a few drops of blood because there are not enough of the organisms in the blood to be found in that way. The type that seems to be generally to blame will not grow in any artificial media we know of. The only way we have been able to grow it is in live rats and the patient's blood. This organism we call X, because we have never grown it on artificial media, and yet we find the organism in our motion picture films. It changes its morphology and rate of motility.

This particular type of infection seems to respond to emetin and also to the succinimid of mercury. What we are trying to do is to carry on that type of research work and be able to differentiate these infections of the body, and to do it we must have competent men. We must furnish microscopes and other things with which to carry on this work.

Lastly, what has the profession done to support the carrying on of this work? We have spent up to this time something like \$10,000. Last year we spent \$4,500, and this year we will spend approximately \$8,000. We have subscriptions now for \$49,000 and a little over. That amount has come to us almost gratuitously from the members of the dental profession as fol-

lows: \$2,400 from your splendid state; \$3,700 from Indiana; \$2,400 from Iowa; \$1,900 from Colorado; \$4,200 from Michigan; \$7,000 from New York State; \$11,900 from Ohio, and so on. (Applause.)

The question is, is it worth while? Surely it is, but it will cost you something if you say that. The method of carrying on the work is one of voluntary contribution. We expect ultimately to have a reasearch institute of the National Dental Association, which institute will be competently endowed as are the Rockefeller or Carnegie institutions. We have already completed arrangements to secure a charter and have a board of directors selected.

The development of this research institute of necessity will be delayed by the war. Other great enterprises that were in process of consummation are utterly at a standstill because of the war conditions, and because the men who had promised to give their money expected to take it from their annual incomes and their incomes have been materially curtailed. We have some good promises which will doubtless be carried out after the war is over. In the meantime we are going on as a dental profession and are trying to work these problems out. There never was a time when the dental profession, if it so desires, could so well step into the breach and furnish information for the medical profession which will be received by that body with open arms, who will give us full credit for our place in the healing art. (Applause.)

ANALGESIA.*

BY H. S. ALSIP, D. D. S., DECATUR, ILL.

This paper is not a technical treatise on N_2O , but is simply a presentation of my experience with N_2O and O analgesia, and I am fully aware that I am presenting a subject that has been pretty thoroughly discussed before this society. It does not seem to me however, that as a profession we have yet recognized the possibilities of this agent.

*Read before the Illinois State Dental Society, May, 1915.

"Every step in progress must go through the successive stages of ridicule, discussion and adoption," and because it is worthy of attention, analgesia is not exempt. It is scarcely necessary for me to say that I most assuredly approve of its use and though it should not be used to the exclusion of other means of controlling pain, it is entitled to a prominent place in dental practice.

No operator should depend wholly on one drug or one combination of drugs for the elimination of pain. The method by which pain and shock may be controlled with the greatest degree of comfort and safety to the patient and convenience to ourselves, should be the method used. With desensitizing paste, conductive anesthesia, pressure and general anesthesia, and analgesia at his command, no dentist is living up to his possibilities or the reasonable demands of his patients if he regularly inflicts any material amount of pain.

The following much quoted paragraph from Dr. De Ford is worthy of again being repeated: "Bold in other directions, commendably progressive in all that relates to manipulative ability and artistic development, the dental surgeon shrinks from anesthetics. He cuts into living tissue, lacerating the nerves themselves, and the only anesthetic usually employed, is that of a witty speech or an amusing story while the patient suffers, cringes, agonizes almost to the state of collapse." Such an indictment should not be allowed to stand against us, but the choice of an agent to eliminate pain should be as much a part of our regular procedure in each case that presents as in the outlining of the work to be done.

It seems that what the profession wants to know about N_2O and O , is, whether or not it is safe and efficient, not only in the hands of the expert anesthetist, but also in the hands of the general practitioner. The clinical experience and laboratory experiments of such men as Hewett, Crile, Teter, De Ford, Graham and others, have demonstrated that N_2O is by far the safest anesthetic known. The danger of even unpleasant symptoms arising during analgesia is practically nil if the operator uses discretion in the selection of patients to whom it is administered, together with regard as to the length of the induction and the depth of analgesia.

I believe that cases for analgesia should be selected, and the habit of observing patient's general condition during the examination of the mouth is a good one to form. Abnormal pulse rate and irregularity of the heart's action, distended blood vessels and crooked temporal arteries, the presence of goitre, nasal polypi, or other obstructions in the nose or throat may be noted and should be done without the patient's knowledge. While the presence of any of these things does not necessarily preclude analgesia, still it furnishes ample warning to the operator who doesn't care to take unnecessary risks by inducing analgesia in uncertain cases. Doubtful cases should not be taken care of in the office of the general practitioner, no matter what his equipment may be. Certainly some such cases present and when they do, they should either be referred to a specialist or some other method employed.

Frequently in our work, we have to combat the fear of pain and the dread of the operation as much as the pain itself. Many patients seem to think that they "had rather bear the ills they have than to fly to others that they know not of," until when they at last do come under our care, loss of sleep, inability to eat and prolonged suffering has brought them to the verge of collapse. The result is, that the smallest amount of pain added to what they have already experienced, is too much for an overwrought nervous system and the dentist is blamed for producing shock. In looking over my records for the past year, I find that sixteen patients in every seventeen had one or more teeth to devitalize or extract. If other men have the same average, it means that one one in seventeen persons who avail themselves of the services of a dentist do so unless driven to it by pain. The success of analgesia lies not alone in the fact that it eliminates pain, but that it also eliminates the dread of the operation and the fear of being hurt. Time does not permit the discussion of shock, but the mental attitude of the patient toward dental operations is one that we should not ridicule or ignore. So long as they are in full possession of their faculties, no amount of suggestion will induce some patients to relax during the extirpation of a pulp, no matter how dead it may be, nor during the preparation of a cavity, however successfully the dentine may be obtunded or the nerve trunk blocked. Analgesia will not

convert hysterical patients into wooden Indians, but a few inhalations of N_2O and O will do more toward persuading such patients that there is a seat on the chair, and that the head and foot rests were not calculated to carry the weight of the whole body, than anything in my knowledge. Most of my first experiences with N_2O as an analgesic were far from satisfactory and as I look back over them, I am convinced that three things contributed mostly to my failures, viz: failure to describe to the patient the sensations usually experienced, too large a percentage of N_2O , and change back and forth in the percentage of N_2O . The sensations experienced during analgesia should be described to the patient either before or during the induction or at both times. This gives the patient confidence and the realization that the way he feels is the way he should feel.

In administering N_2O and O, the operator should bear in mind the law of anesthetic accommodation. "Living units of the animal body will more readily adjust themselves to altered conditions of existence when the conditions are applied gradually." The desire to carry the patient to the operable stage as quickly as possible often makes it necessary to diminish the pressure in the bags or the percentage of N_2O , a thing to be avoided if possible. Patients tolerate the gases much better if the variation, if there be any, is always toward a deeper analgesia. Changes back and forth in the pressure or percentage, with the consequent changes in the patient's condition, tend to provoke restlessness and nausea. All instruments, burs, stones, etc., should be conveniently placed and the procedure in each case carefully outlined in order to make the duration of analgesia as short as possible. Long inductions are neither necessary nor desirable. I have been using gas-oxygen for three years and have never yet administered it for longer than twenty minutes and the average duration has been but about ten. Some operators report keeping the patient in this condition for two hours or more, but I have never found it necessary, though in selective cases I see no reason why it could not be done with safety.

The temperament of the individual largely controls the technic of administration. No two patients are alike, nor is any one alike at different times, therefore no definite rule can be laid down. Patients for analgesia seem to come under two

general classifications. Those who could and would endure the pain, but welcome a relief from it, and those extremely nervous patients who will hardly allow a tooth to be touched.

For those who have a healthy nervous system and a desire to keep it, I induce a light analgesia, beginning to operate as soon as the effects of the N_2O are felt, until the sensitive part of the operation is reached, when I increase the percentage and maintain a deeper analgesia until ready to remove the inhaler. For these patients I keep the air valve open and regulate the analgesia by the percentage valve. For those almost unmanageable patients whom we used to devoutly wish the other fellow had, who after an hour spent in the office, left us unfit for practice the rest of the day, I set the percentage valve at 50 per cent N_2O and 50 per cent O , and start with the air valve open. As analgesia progresses I close the air valve and regulate the depth of the analgesia by the pressure in the bags.

The first method is more economical but requires more attention in order to maintain an even analgesia. The latter requires more oxygen but by it an even analgesia is easily maintained, with very little attention to the apparatus.

The unintentional exposure of the pulp, due to the patient not being in a condition to co-operate with us, occurs no more often under N_2O and O , than when it is not used. Frequently with the patient in full possession of his faculties, a pulp may be exposed with no more pain than that which persists throughout the entire cavity preparation. In fact the horn of the pulp can usually be exposed with *less* pain than is usually experienced during the cutting out of a deep fissure or a step for retention. Pain is not necessarily an indication of proximity to the pulp. The eyesight and judgment of the operator is of far greater importance than is the expression on the patient's face. The danger to the pulp during analgesia, lies not so much in unintentional exposure as from traumatic injury. The ill effects of a heated stone or a dull bur are just as great when the pain is not felt as at any other time. Personally, since I have been using N_2O and O , I have saved more pulps than before, because I have been able to properly prepare hypersensitive cavities in teeth that formerly would have been devitalized. Us-

ing the same precautions to safeguard the pulp during analgesia as at other times, the comebacks will be no more frequent.

My few observations of blood pressure are presented as being of interest rather than of any clinical value.

Blood pressure depends upon four factors: The rate and force of ventricular contraction; the elasticity of the blood vessels; peripheral resistance; amount of circulating blood.

The only factors of clinical importance to the dentist are the rate and force of the heart's action and the peripheral resistance, as those are the only ones that change during short periods of time.

Blood pressure is not a factor in analgesia for the average rise is only about 10 mm. The lowest test was 5 mm., the highest 15 mm. How much of this was dependent upon the anesthetic and how much to the psychical factor is impossible to determine. A number of tests in the same individual showed a higher pressure at the first exhibition than at subsequent times.

The observation of blood pressure when N_2O was not used has been of more interest than when it was used. I have seen it rise 20 mm. in a patient whose nerves were near the breaking point from over-work during the cutting of retention form in a devitalized molar. Not from fear nor from pain but the shock of the revolving bur. I have also seen it rise 20 mm. during the extirpation of a devitalized pulp due to fear and 25 mm. during a painful cavity preparation. If blood pressure is of any concern to us it should be when analgesia is not used rather than when it is. Whenever a patient braces himself in the chair with all muscles taut and the blood vessels stand out on the temple and forehead, you may be sure that the blood pressure is away above normal in that individual and that so far as injury to his circulatory system is concerned, N_2O and O should not even be compared.

In presenting this paper I have endeavored to touch briefly on the following points:

1. That N_2O should not be used indiscriminately or exclusively, but that in practically all cases some method should be employed to do away with fear and prevent pain and shock.

2. That N_2O and O is safe and efficient when discretion is used in the class of patients to whom it is administered.

3. That the analgesia state of general anesthesia is the only way to prevent psychical shock.

4. That the technic of administration is simple.

In conclusion, I wish to say that in at least 95 per cent of the cases in which I have used or attempted to use N_2O and O , analgesia, it has been a boon to the patient and a satisfaction to me. A great deal has been said about the expense of the gases. Dentists do not have many things donated to them. All equipment costs money, but my experience has been that the gas apparatus has been one of the best paying investments in the way of office equipment that I have ever made.

I trust this paper will help some toward a more general use of N_2O and O .

STREPTOCOCCICOSIS DENTALIS.*

BY DR. F. B. KREMER, MINNEAPOLIS, MINN.

The year last passed has witnessed the advent of marked changes in our conception of general and special pathology.

Old ideas have given way to new, and seemingly more rational, doctrines of disease.

With this changed viewpoint has arisen the necessity for new words and phrases so that we may give proper expression to our thoughts with brevity and clearness.

Being so largely creatures of habit, in thought and action, we are obliged to cultivate familiarity with new methods of expression before we can successfully visualize the object or condition described.

To say that a certain man has tuberculosis is to convey to your understanding by one word, a condition which, to describe at length, would require much time and effort, and yet it is within my memory that it has become a word of common use.

To speak of typhoid is to suggest at once the typhoid bacillus, protracted fever, long weeks in bed and the undertaker an intimate possibility.

We discourse glibly of smallpox, measles and scarlet fever

*Read before the South Dakota Dental Society.

because of the habit of familiarity but when the author used the expression which supplies my text, I must confess that I looked at him with ill concealed suspicion.

Should you be inclined to regard me in like manner, I only ask that you reserve final decision (or shall I say action?) until I shall have had time to explain, assuring you in the meantime that the use of the expression does not constitute a breach of neutrality or describe a breakfast food.

About one year ago Dr. Charles Mayo of Rochester, in a public utterance said that "the next great step in preventive medicine must come from the dentist" and coupled it with the question, "are you (the dentists) ready to accept the responsibility?"

This remark was the subject of much discussion in the secular press and was followed in August, 1914, by a paper read at Duluth before the Minnesota State Dental Association by Dr. Henry L. Ulrich, of Minneapolis, on "Some Medical Aspects of Certain Mouth Infections."

The *Journal of the American Medical Association* for September, 1914, contained articles on the same general subject by Drs. Mayo, Billings, Rosenow and Craig.

Dr. Moody and Dr. Gilmer have also contributed to the literature of the subject as have Drs. Hartzell and Henrici, of Minneapolis.

These investigators have been unanimous in their judgment of the pernicious influence of mouth infections upon the general economy and a large majority of them have agreed upon the *Streptococcus* group as the active organism involved.

As to the *modus operandi*, the writers with one exception, have not been entirely clear in expression.

They have been content with argument of relation and have acquitted themselves so ably that the fact has ceased to admit of dispute.

The exception noted was the article by Dr. Ulrich in which he stated his conclusion that the so-called "blind abscess" at the root ends of pulpless teeth was the most prolific source of evil and further proved to our satisfaction that they are not primarily a dental disease, but are of blood origin and that our pulp surgery and therapeutics have nothing to do with their presence.

In other words, the pulpless tooth is an area of lessened resistance and forms a safe and convenient nidus for pathogenic organisms, which may be afloat in the blood stream.

Having lodged here they multiply and send out a part of their offspring to form new colonies and new centres of distribution.

Many theories have been advanced to explain the action of these organisms upon the living host but at the present time the expression "focal infection," appears to carry with it the picture of bacterial infarction with a localized necrosis as the immediate result.

To illustrate this point more clearly, let us follow the course pursued in a given case by these elements.

We will select for our purpose a man who measures up to the standard of normal health; his resistance, or to use a more modern term, his immunity, is high and his ability to defend himself against the encroachment of disease is sufficient for the purpose. This is accomplished by his physiological ability to manufacture the necessary anti-bodies to destroy the omnipresent germs of disease as he may absorb them through tonsils, lungs, intestinal tract or skin abrasion.

He pursues a normal course of living and escapes injury. The time comes, however, when unwonted mental or physical demands exceed his strength. He may have slept in a germ laden atmosphere and a tonsillitis results from the lodgment in the tonsillar follicles of streptococcic organisms at a time when his immunizing mechanism was below its normal efficiency.

Having found lodgment, they multiply rapidly and adapt themselves to their new tenement. By their presence and numerical strength they become active irritants to the invaded territory, thereby stimulating the local immunizing mechanism, which throws large reinforcements in to the area already being attacked from without.

The net result is an impeded circulation and a breaking down of tissue at these sites where infarcts occur, which gives entrance to the circulation and the enemy invades the bloodstream and runs riot in its search for new points of attack.

The abundant blood supply to the mouth carries many of these organisms there and if there be areas of lowered resist-

ance in the form of devitalized teeth, the establishment of new foci or centres of distribution is effected.

About this time the jolt to the immunizing elements has been so great that the necessary quantity of anti-bodies has been generated to overcome the acute attack and the tonsils are freed for the time being of the enemy, but, in the meantime those that have located at the root ends of teeth have fortified their position by a connective tissue covering and bid defiance to attack.

Here they thrive and send out scouting parties to explore the host for other weak positions. In their travels many are destroyed but some escape.

These become lodged in end arteries and the result is a breaking down of tissue and we have re-enacted the battle of the tonsils with the difference, that due to the different fields of attack we apply different terms of expression and speak of it as arthritis deformans, pericarditis, duodenal ulcer, pyorrhea or a half dozen other names meaning nothing but geographic location.

In all this we have failed to describe the condition and therefore have failed of a proper understanding of the pathological significance of a stiff knee or a lame back.

Dr. Ulrich has given us a name wherewith to cover that class of focal infections due to the streptococcic group, namely, "Streptococcicosis" and I have added the word *Dentalis* to separate or identify those cases which are dependent upon dental foci from those of other origin.

I would ask you to consider with me for a few minutes just what the acceptance of this word by the medical and dental professions means to humanity.

The surgeon who recognizes the term would refuse to do a laparotomy until all initial foci were known and disposed of.

The Internist would pocket his salicylates if he recognized sore muscles and swollen feet as evidence of the necessity for intelligent dental service.

The dentist would make friends with the medical brother across the hall and secure his help in determining the patient's ability to withstand the possible consequences of opening up infected areas by extraction and possibly lighting up a dormant

or new focus in heart, kidney or prostate, thereby introducing his patient to imminent danger of destruction.

Let me give you some facts and figures that have played a large part in aiding my reason to a definite conclusion:

A tooth has relation with the general economy through its pulp and its pericemental membrane. While its vital connection is more largely pericemental than pulpal, yet both play an important part in this union, and the loss of the pulp measurably diminishes the physical resistance of a tooth, and renders it of so low vitality as to readily invite bacterial insult.

Teeth may become foci of infection in either one of several ways: first and most frequently, by secondary deposits at the root ends from the blood-stream. This results in the formation of the blind abscess, which we understand to mean one which has no visible opening. This type of abscess is most to be feared, as it is painless in its formation and in the performance of its activities, and may be carried by the patient indefinitely without his knowledge. Having no sinus, it empties its products directly and entirely into the circulation.

Teeth may become foci of infection by direct planting of pathogenic organisms through cavities of decay and exposure of root-canal contents to the impact of food in process of mastication, thus forcing extraneous septic matter through the apical foramina by plunger or piston action into one of nature's best incubators.

This method usually results in the production of an acute abscess with rapid pus-formation and severe pain. Relief is usually had by surgical interference or by the formation of a fistula through the alveolar process and over-lying gum tissue. In either event, the major portion of its products finds outlet and escapes relation with the circulatory system.

That condition known as pyorrhea must also be considered in this connection. While I am inclined to believe that its value as an etiologic factor in other diseases of septic character has been greatly overestimated, it is of sufficient importance to merit our respect, and it calls for the closest scrutiny when present.

Its value is about that of any open suppurative ulcer of like size and character on any part of the body. Its etiology being in

dispute, it has a speculative interest for us which should stimulate study of its genesis, as well as of its revelations.

Is it responsible for the leading of the blood-stream with pathogenic organisms, or is pyorrhea a secondary condition, and to be accepted merely as evidence of the presence in the blood-stream of parasitic elements? Will investigation prove to us at some later date that this condition is merely a barometer by which we may determine the degree of activity of these parasites?

Teeth may also become foci of infection by direct mechanical irritation of nerve-trunks or terminals by inducing trophic or nutritional neuroses, thereby lowering their own resistance, as well as that of the immediately adjacent structures.

An examination of 269 radiographs of filled roots of teeth supplied some interesting data.

Of these filled roots 211 showed defined abscesses and 47 showed bone infiltration.

The remaining three gave no evidence of disease.

An examination of radiographs by my co-worker, Dr. Ulrich of 1,000 teeth with filled roots showed 71 per cent of well defined abscesses.

Verification of our orientation of these films was had by over 150 cultures, all but six of which yielded streptococci.

These cultures were made by the following routine method:

The mouth was first sprayed with an alkaline solution. The teeth to be removed were isolated with sterile cotton rolls after which they were dried and the gingival margins brought in contact with the electric cautery.

This was followed by a bath of Tr. of Iodin, after which the teeth were removed with sterile forceps and a platinum loop was passed carefully to the apical area and its burden transferred to blood agar.

These cultures were all taken from cases with recorded histories of focal infection and covered endo and pericardial disturbance, arthritis deformans, cystitis, duodenal ulcer, neuritis, diabetes, albuminuria, chorea, iritis, pernicious anemia, and one case of chronic herpes, which yielded to the beneficent influence of an autogenetic vaccine.

A large majority of these cases were either benefited or

restored to health by exodontia alone or combined with tonsilectomy.

Of the remainder, many were referred to the immunologist for vaccine therapy to supplement the surgery. Of those so referred the majority were benefited or cured. Some received no appreciable help.

In the larger number of cases our surgery was followed by appreciable reactions.

In some it was very severe. One case of arthritis had so severe a reaction following the removal of a molar tooth and draining of the antrum that he is now a hopeless cripple. One case of pernicious anemia and one of lymphatic leukemia died.

The surgery was performed under gas, ether or Novocain-Adrenalin anesthesia.

The reactions under Novocain-Adrenalin have been less marked than under general anesthesia; due probably to the fact that general anesthetics lower immunity by shock or depression.

In our own community opinion is much divided. There are those who hold to the belief that it is all a question of technique. That the root abscess is always planted through the root canal as a result of septic surgery.

This argument is best answered by a statement that any bacteriologist will indorse.

That it would be physically impossible to duplicate the tabulated results if one tried to do so.

Your essayist maintains that the facts are such that the practice of pulp devitalization and root canal filling should cease.

The etiology of streptococciosis is due to the streptococci group, and next to the tonsils, the alveolar abscess is the commonest form we have to take under consideration.

PRESIDENT'S ADDRESS.*

BY WILLIAM HOPKINSON, D. D. S., MILWAUKEE, WIS.

The pleasant privilege of welcoming a number of professional brethren, to this the forty-fifth annual meeting of the Wisconsin State Dental Society, is a source of extreme gratification to me.

The warmhearted greeting from the chief executive of this city of rest and recreation, voicing the sentiments of this community, ought to inspire us to be faithful and earnest in our work while here, and to measure to the full standard of our obligations, in seeking out the truths of nature and science and promulgating them for the benefit of humanity. Your very presence here means that such will be the case, for only those devoted to the best interests of their profession will make the sacrifices necessary to attend such gatherings.

Therefore on behalf of the Wisconsin State Dental Society I take great pleasure in extending to you all a most hearty welcome, and a cordial invitation to participate in the deliberations of this meeting.

This occasion is one I can not let pass without again voicing the strongest sentiments of appreciation of the honor, with which this society invested me in Fond Du Lac last year and again sincerely thanking you for the confidence thus manifested.

PROGRAM

I feel sure that I voice the sentiment of every member present when I express to the chairmen of the program, clinic, local arrangement and exhibit committees and the members thereof our heartfelt thanks and appreciation of their labors in our behalf, as is evidenced by the splendid program they present to us for this meeting.

Our annual meetings mark the time of our progress, they recall the advancement in our profession. They should stimulate the energy and research of every member and quicken his genius. They should open store houses of information to the earnest seeker and every meeting should help to some onward step.

Today our profession seems to have taken its rightful place in

*Read before the Wisconsin State Dental Society, July, 1915.

point of appreciation and respect, and we have no cause for humiliation for the part it has performed in the progress of the age. We as a profession must still press forward; new problems are constantly being presented to us to solve.

I believe our responsibilities were never as great as they are today; within the past year, questions of vital importance to the general health of our patients and to the public welfare have been literally forced upon us. What is the duty of the profession toward the new things that are being presented?

We are professional men, within our field of service; we are the guardians of the interests and wellbeing of the communities that we serve. Is it not our duty to inquire into new things or ideas that may be presented and make such exactions as to the proof of their correctness as shall leave no reasonable doubt, before recommending them? It is the duty of our profession to carefully examine all such things and not pass them by with indifference, for if they prove good, they should be developed.

DENTAL EDUCATION

In what sphere of our general practice does the average practitioner of today feel most acutely his inability to accomplish, even by sincere and faithful service, all that he would desire in overcoming the effects of disease or accident, as is daily presented?

We believe a large percentage would cry for help from the division of therapeutics, pathology and surgery. We believe that until within the last few years these divisions, above all others, have not been given the serious consideration they deserve.

Our educational institutions have not emphasized these branches because the profession has not demanded that they do so; yet we believe that our educational institutions are today graduating better material, both mechanical and medical, than ever before in the history of dental education. Mechanical dentistry must and always will be a major part of our dental education, but many of us have been compelled within the past year to realize the serious relationship of medical dentistry to the general health of our patients. We realize that the demand of the times is for a higher standard, that study and research have developed the general interdependence of all bodily tissues and their functions; that dentistry is a special department of medical science, and embraces the structure, func-

tion and therapeutics of the mouth and its organs, together with their surgical and prosthetic treatment. The time has passed when he who assumes the care of the mouth, and thus guards and protects the main portal of the entire organism, can feel that his work is accomplished by filling cavities and inserting teeth.

We believe that future dental education should embrace all of the mechanical and very much more of the medical science. The question of how the curriculum of the dental schools can be broadened and strengthened along these lines is one that requires a great deal of careful thought and mature judgment. The present three-year course is crowded to its fullest extent; it has already been decided to extend this course to four years.

It has been said in the past and is now being advocated by many writers, that the M. D. degree should be obtained before taking up the practice of dentistry.

With this view we can not agree, but we do believe that in order to meet the present demand for a broader and more efficient dentistry, in its relation to the general health of the patient, that it is necessary, as has been stated by one of our prominent dental educators, to teach medicine in so far as is applicable to the specialty of dentistry. And the line of advance should be to improve and expand the medical ideals of dental teaching.

The expectation that the highest efficiency in dental practice may be attained through the medical curriculum can not be true, because that curriculum does not fit the demands of efficient dental practice.

The curriculum of medical schools is being constantly changed with a view to making better physicians, while that of the dental schools should be developed toward making more efficient dentists, utilizing for that purpose all of the medical science and art that is adaptable to its purposes.

ETHICS

In the study of ethics, both general and professional, one central truth forces itself into recognition; that the man who seeks gain at another's loss is not truly selfish, because he defrauds himself in the end.

But one who considers the other's welfare in preference to his own serves his own interests best. This is selfishness of the right sort, selfishness fully in accord with natural law and with any

logical line of ethical thought. I want to make a plea for a broader and more general discussion of this subject. During the time I have been attending dental society meetings, every dental topic save this one has been discussed.

As a profession, we should have our codes and ethics fundamental, clean and unmistakable. We should know what is expected of us in our relation with our patients and with each other. No one should urge the plea of ignorance in attempting to justify himself for unprofessional conduct. Yet when the question does arise, as to what constitutes professional ethics, we are more or less at a loss in making a clear and direct answer.

It is pronounced by our code to be unprofessional to resort to public advertisements calling attention to peculiar style of work, prices for services, or special modes of operating, or to claim superiority over a neighboring practitioner. To publish reports of cases or certificates in public print, to go from house to house soliciting or performing operations, to circulate or recommend nostrums, or to perform any other similar acts.

One can not fail to note in the above features of the code the emphasis which is given to all misdemeanors involving the stealing of his neighbor's business, and its utter lack of emphasis upon all matters relating to the stealing of his character.

Ethics in its broad sense, we believe to be the science of right conduct and right character. Dental ethics is the application of this doctrine to the special case of dental professional relations.

Our code of ethics should deal more specifically with this question of right conduct and right character and a clear definition be given as to what constitutes ethical professional conduct.

We believe it is well at this time to refresh our memories and recall some of the phraseology used in our own and other recognized principles of professional ethics.

(1) A profession has for its prime object the service it can render to humanity; reward or financial gain should be a subordinate consideration. The practice of dentistry is a profession, and in choosing this profession an individual assumes an obligation to conduct himself in accord with its ideals.

(2) The obligation assumed on entering the profession requires the dentist to conduct himself as a gentleman, and demands that he use every honorable means to uphold the dignity and honor of

his vocation, to exalt its standards and to extend its sphere of usefulness.

(3) In order that the dignity and honor of the profession may be upheld; its standard exalted; its sphere of usefulness extended and the advancement of dental science promoted, a dentist should associate himself with dental societies and contribute his time, money and energy in order that these societies may represent the ideals of the profession.

(4) It is unprofessional for a dentist to assist unqualified persons, to evade legal restrictions governing the practice of dentistry; it is equally unethical to prescribe or dispense secret medicines or other secret remedies, manufacture or promote their use in any way.

(5) Dentists should expose without fear or favor, before the proper legal tribunals, corrupt or dishonest conduct of members of the profession, and should aid in safeguarding the profession against the admission to its ranks of those who are unfit or unqualified, because of being deficient either in moral character or education.

(6) One of the oldest maxims in medical ethics, which also applies with equal force to the dental profession, is that a physician should be an "upright man instructed in the art of health, consequently he must keep himself pure in character and conform to the high standard of morals, and must be diligent and conscientious in his studies. He should be sober, patient, prompt to do his duty, conducting himself with propriety in his profession and in all his actions of life.

We believe the foregoing statements show to us in a general way what our duty should be to our patients, to other members of our profession, to the public and to ourselves.

We hold it to be a fundamental principle and action in ethics that to know and do the right is productive of greater good to the individual than to do the wrong. In closing this subject I wish to add that a professional life has also a commercial side; we can not get away from this fact.

We must live in a manner commensurate with our social environments, we must have the means with which to acquire knowledge and keep up with progress; health must be guarded and physical efficiency kept up to the top notch. These are the demands that must be met for self-protection and self-preservation.

MEMBERSHIP

The question of how to increase the membership of this society, has been discussed from time to time at our annual meetings. It is still open for discussion, and we believe it to be one of the important topics that should be considered at this time.

I find from past reports that at the time of reorganization in 1908 this society had a membership of less than 200, at the next annual meeting in 1909 the following eight districts and county societies were organized: Milwaukee County, 115 members; Dane County, 23; Columbia County, 13; Manitowoc County, 14; Sauk County, 9; and Walworth County, 10. La Crosse District, including the Counties of La Crosse, Vernon, Jackson and Trempleau, 26 members; Eau Claire, Chippewa and Dunn Counties, 24 members.

This makes a total of 234 members, and from this time on there seems to have been a gradual increase in membership until at the present time, we have fourteen district and county societies, namely:

	Members
Central Wisconsin Dental Society.....	39
Eau Claire, Chippewa Falls and Dunn County Dental Societies	36
Fond Du Lac County Dental Society.....	16
Kenosha County Dental Society.....	7
La Crosse District Dental Society.....	45
Manitowoc County Dental Society.....	18
Milwaukee County Dental Society.....	148
Racine County Dental Society.....	17
Sauk County Dental Society.....	11
Waukesha County Dental Society.....	11
Winnebago County Dental Society.....	35
Dane County Dental Society.....	35
Rock County Dental Society.....	31

Northern Wisconsin counties about 17 members, making a total membership in the organized component societies of 449, and to this number we can add 200 members, having no affiliation with any district or county society. This brings the total membership of the State Dental Society at the present time up to 649.

This shows an increase of 450 members since the reorganization or an average increase each year of $64\frac{1}{2}$ members. We con-

sider this gradual increase in membership to represent a fairly healthy growth; but when we consider that we have in Wisconsin about 1,400 practicing dentists, and that this society represents less than one-half of that number, it would seem that some concerted action should be taken at this time to increase our membership.

We are aware that a great deal of credit is due our Treasurer and Secretary, Dr. Gropper and Dr. Krause, for their untiring efforts and splendid work in organizing the component societies in the past. But we are of the opinion that this work should be taken up by every member of the society in order that this society should represent at least 75% of the practicing dentists of Wisconsin.

I at this time wish to call your attention to a suggestion made by Dr. Hardgrove, in his address at our last annual meeting:

"That we are approaching and in a few years will be called upon to celebrate the fiftieth anniversary of the birth of this society. That something in the way of economy should be practiced, so that we will have funds on hand to celebrate our fiftieth anniversary in a fitting manner and in keeping with the progress of the times."

With this suggestion in our minds, let us make a membership of 1,000 our goal for the Golden Jubilee of this society; and with the large increase in membership would come the solution of the question of economy.

With a membership of 1,000 the annual dues would amount to \$2,000.00, which would place the society in a financial position to make the annual meeting in 1920 the largest in membership, and if held in Milwaukee, the most successful in its results of any in the history of the society.

I would like to suggest that a committee be appointed at this meeting to be known as the Membership and Educational Committee, the duties of this committee to be the carrying out of a plan to increase the membership of this society to 1,000 members in the next five years.

The educational duties of this committee should be the devising of some method of bringing the members of this society in closer touch with each other, in the intervening time between our meetings.

I believe this can be accomplished by a system of exchange of papers, to be given by members of the different component societies throughout the State.

This would in a way be taking the society's work to its members and keeping them alive to the interests of the State society. This work should be carried on in co-operation with the Editor of our State Journal. And the reports of this committee together with the papers of our component societies when published would furnish ample scientific material to grace the pages of our State Journal.

In other words, my idea is that this committee shall have the power to organize and promulgate an extension bureau; whose educational features will be extended to every member of the various component societies throughout the State.

Since our last annual meeting we have lost, by death, one of the oldest and most beloved members of our profession and of this society, Dr. G. B. Maercklein. On account of his long, unselfish and untiring work for the dental profession and this society, I suggest that a committee be appointed to formulate appropriate resolutions as evidence of our high esteem for our deceased professional brother and beloved friend. And that a copy of these resolutions be sent to his bereaved family and one spread upon the minutes of this meeting.

In conclusion I wish to say that the literary program and clinics of this meeting are intended to present to you the most advanced thoughts on the vital problems before the profession today. They are to be given by men who are capable of presenting them in a scientific manner.

We sincerely hope that this meeting will be a great success and that in 1920, the year of our Fiftieth Anniversary we may look with pride upon the achievements of this society.

This society has always maintained a high professional standard, and has not been found lacking in constructive work. If the Wisconsin State Dental Society can have the co-operation of its district and county societies, all working harmoniously to bring about a closer relation of its members and the absolute elimination of all suggestion of politics, it must and will advance.

PRESIDENT'S ADDRESS.*

BY F. J. YERKE, D. D. S., MINNEAPOLIS, MINN.

The speaker appears before you at this time, not because of any banner qualities as a platform speaker but rather in conformity to the time-worn custom which imposes upon the executive officer of any organization the duty of presenting to the members of such an organization a message setting forth conditions as they exist, commending that which to him may seem worthy and recommending such changes and such measures as may seem to him to be imperative in order that the organization may be more efficient and more successful in carrying out the purpose for which it exists.

However exacting this custom may be, it cannot be said to be undesirable, unless it brings forth a message characterized by a destructive rather than a constructive policy.

Coming from an officer who has borne the responsibility imposed upon him, this message should be characterized by an unbiased statement of the past and suggestions of a constructive nature with regard to the future. In this spirit and with this purpose, looking only to the good of the organization as a whole, and impressing a lesson that must appeal to the best intelligence of the members as well as prospective members, that which follows is respectfully submitted for your consideration and action.

Two years ago today the association began a campaign under the present district plan. At the expiration of this second year, as we scan our horizon, we may justly expect to see beneficial results accruing from our labors. Are we gratified? Yes and no—Grateful for the spirit of responsibility; for the broad, professional spirit manifested by a large percentage of the men in each district; for the ties of friendship developed by reason of duties in common; grateful for the opportunity it has brought the association to press into service willing workers whose ability has heretofore been unknown because they have had no chance—we are thankful that every district is a part and parcel of the State Association and through its delegate has a voice in the management of state affairs.

These, together with other conditions too numerous to mention,

*Read before the Minnesota State Dental Association, June, 1915.

are truly gratifying and make us feel that our efforts are really worth while.

There are a few other points, not many, that call for, at least, a cursory consideration. There are a few men in this and every state, who have such an exalted opinion of themselves that any movement—any activity, not originated by themselves must necessarily be unworthy—men who being inactive and useless, not to say harmful in the advancement of the profession and the best interests of the public, are so insanely jealous in regard to the broad-mindedness and activity of any and every competitor that any effort for the achievement of better service to the public is at once construed to be a desire to gain recognition in the columns of the press. May God be merciful—may He, in His Infinite Wisdom, have compassion on their poor, stunted souls—may He open their eyes that they may see—their ears that they may hear and appreciate what suffering is due to their unwarranted criticism and lack of co-operation.

In view of the wholesome agitation within recent years along the line of sanitation, especially with regard to the oral cavity and also in view of the fact that the busy practitioner, who most appreciates the value of such service to the public, is unable to devote the time required for this important service, it seems to us imperative that something be done to remedy present conditions. Our best authorities stand ready to back us in our statement that one skilled practitioner of prophylaxis will save more teeth than ten average practitioners can save by reparative measures and yet our laws are such as to preclude the public from obtaining the services of any one, be he ever so skilled and supervised in the practice of preventive measures, unless he be a graduate in all departments of dentistry. It seems to us advisable, if not imperative, that a committee be appointed or designated for the purpose of formulating and putting into effect measures for the establishment of a proper course of instruction for assistants, who desire to qualify themselves to take over this department of our work, the field of such licensed assistants to be limited to oral prophylaxis only, and to be practiced within the offices and under the direct supervision of members of this association and not elsewhere except by special written permission, designating the place and signed by every member

of the Executive Council of the State Organization, or the members of the State Board of Dental Examiners.

We believe that if this plan were perfected and put into operation, it would add tone to the practice of dentistry, and supply in a measure, the needs of oral sanitation.

There is another and a very important field of service that must be invaded, if we would keep abreast with the procession and fulfill our mission in point of humanitarian service, realizing as we do, the nature and extent of infection directly traceable to diseased teeth, and the abnormal surrounding tissues; and knowing how obscure and seemingly spontaneous the beginning of an epidemic frequently seems to be, our organization should be the moving factor in spreading the gospel of mouth sanitation; and yet, little or nothing has been done in a concerted way by this organization to impress the importance of care and cleanliness of the oral cavity.

We present these facts to you for your earnest consideration and attention, and trust that at least a small fund may be made available in order to secure the services of the press and platform in the interest of attaining the desired results.

The subject of funds brings us to the consideration of another matter of very vital importance and calls for consideration far more detailed than is possible within the scope of this communication. With dues approximating twelve hundred dollars annually, to which may be added a substantial amount in the form of revenues from exhibitors, we should be able to fulfill every promise to the district societies, finance an excellent annual meeting, and have available funds for worthy enterprises, the undertaking of which is pre-eminently the duty of our organization.

We have not made good to the district societies in regard to stationery, magazines and other kindred promises, which we made at the time of the re-organization—we have been obliged to postpone indefinitely the printing of our constitution and by-laws as amended at our last session—and why—because of lack of funds. We cannot but feel that our funds have not been properly conserved. This criticism is not directed at any one man or any two or three men; but at the combined forces that have shaped our policy.

During the period since the re-organization, the programs of the various district societies have been the product of a few willing workers, while a large per cent of the membership played the part of idle spectators with a special inclination on the part of a few, to unfair criticism. This is not right. We feel that the membership of each district should be divided into a suitable number of groups, and arrangements made for a corresponding number of meetings plus one each year. It would then be unnecessary to urge the attendance of others in the district—except members of the group for whose benefit such meeting was being held and all of whom would be expected to appear as clinicians under the direction of a demonstrator from within the State, selected by the group and paid by this Association. This arrangement would afford a large field for variation. For instance: Dr. Brown may be using some special method in his practice, which his friend, Dr. White, desires to see demonstrated. Dr. Brown would, no doubt, be induced to demonstrate his method to Dr. White, and incidentally, interest Dr. Green and other members of the group in session. Some such plan as this, perhaps modified, and varied, would relieve the over-worked officers of the district organization, shift the strain of the financial situation, and serve to develop every member as a clinician, instead of loading the work on a few willing workers.

The extra meeting suggested should be devoted to a social gathering of the district, election of officers and transaction of other business of interest to the entire district. Many lines of activity suggest themselves under this latter head. We shall take time and space to mention one: The selection of say ten per cent of the membership as clinicians for the next State meeting. This, by the way, would place the selection of clinicians upon those who best know them and make the distribution equitable and truly democratic.

These suggestions constitute merely a crude outline of a plan for your consideration and such development and action as your organization may see fit to take.

We have said that our finances have not been properly conserved. It is our desire to substantiate that statement with facts, and with this in view, we wish to enter into a brief consideration

of conditions and methods as they have been and as we feel they should have been, and should be in the future.

Heretofore, we have purchased stationery, supplies, services of stenographers, reporters, and all other necessary incidentals, including rental of place for annual meeting and the services of clinicians, without very much knowledge of, or concern as to the financial outcome. This method, we believe, is destructive to the confidence of members and prospective members of this organization, and should be changed in order that we may have funds with which to carry out the legitimate enterprises of this organization; with which to meet the needs of the commonwealth; with which to fulfill the mission of a body of professional men, banded together for the purpose of self-betterment and the betterment of civic problems that fall within the lines of our activity.

We believe that past conditions and business methods can be greatly improved by the appointment of a purchasing agent or financial secretary, over whose signature and through whom alone, financial obligation would become valid. This would relieve the corresponding secretary and the executive chair, whose duties and responsibilities are sufficiently arduous, of the necessity of investigating every financial obligation created by various officers of our organization and centralize the purchasing power in one, to whom we would look for a detailed, written report at each annual meeting.

This, we believe to be a step in the right direction for the purpose of guarding our expenditures, and creating a fund for the purpose of executing such measures as this organization may see fit to undertake.

There is another matter of vital importance, to which we desire to call your attention: Knowing as we do, that altogether too large a per cent of men throughout the State do not attend gatherings such as this, and in fact, mingle but little with fellow practitioners in their own locality, limiting their sphere of development to a casual glance over the contents of a dental journal, only to find the contents comparatively uninteresting by reason of dealing with men and matters more or less foreign to the reader; would it not be well to consider some plan that would

stimulate the interest of men whom we do not reach under present conditions?

To this end, we wish to recommend that this organization adopt some good journal as its official organ, so that the librarian could conform in his services to the provision as outlined in Sec. 5, Art. 5 and Sec. 7, Art. 8 of our Constitution. We do not wish to infer that we find fault with the present librarian—his work has been all that could be expected under present circumstances. We do not feel that we have occasion to offer any apologies for the work of the present administration. Your officers have worked hard and faithfully in the performance of their duties under trying conditions, and we desire to express our appreciation of their services as well as the hearty co-operation of the officers of the University and others whose support has made the program of this session possible.

It is due wholly to this faithful service and co-operation that we are enjoying a program designed specially for the development of our own men, and, at the same time, conserving our funds.

The advisability of holding closed meetings in the future is a matter which should come up for consideration at this time. We cannot enter into a discussion of the merits of the system; in fact, we do not think it necessary, but we do believe that the efforts of this organization along the line of instruction should be for the benefit of its members and members of other similar organizations, and that all non-contributors should be barred.

There are many other things of a business nature that we might well consider—things, which by reason of repetition, have become customary and which when summed up, constitute the policy of our organization; but we do not feel they can well be taken up within the scope of this communication. We have nothing but words of commendation for a large per cent of the men in our profession—we can say truthfully that, as a class, they are able and willing workers—but here and there we find one who has such an exalted opinion of self and his services that any and all services for the maintenance of our standards and the upbuilding of the profession are promptly withheld until he receives a satisfactory answer to his all-important question—"What is there in it?" The spirit of these men we deprecate,

their services, we believe, are costly at any price, and the sooner these men are made to realize the attitude of this organization toward those seeking personal aggrandizement and remuneration in dollars and cents for every service rendered to the profession and to the public, the better it will be for all concerned.

One more thought and we shall leave all for your earnest consideration and such action as your combined judgment may dictate. Let it be known that we men, assembled here on this occasion, constitute the active force, the working factor, the guiding power, in shaping the future of this organization; may our slogan be—conservation of funds; betterment of our ranks, and service with a never-failing devotion to the cause of our profession and our commonwealth; may we be earnest in dealing with the problems laid upon our threshold, solving each with special care to avoid extremes; creating and maintaining interest in all that makes for good in a world filled with golden opportunities to uproot a thorn and plant a flower along the path of life.



PROCEEDINGS OF SOCIETIES.

ILLINOIS STATE DENTAL SOCIETY, FIFTY-FIRST
ANNUAL MEETING HELD AT PEORIA,
MAY 11, 12, 13, 14, 1915.

DISCUSSION ON THE PAPER OF DR. W. C. SMITH, ON "DISEASED
TISSUES OF THE ORAL CAVITY."

DR. L. L. DAVIS, Chicago:

My first duty, in opening the discussion of this paper, is to congratulate the society on its choice of the program committee.

The topics selected show rare judgment, in their timeliness and applicability to the questions of the hour, and certainly the attendance and interest shown in those subjects already presented prove this to be the truth.

Your president this morning emphasized the necessity for a more extensive knowledge of medical subjects by the profession, and another speaker dwelt upon the movement for post-graduate work and the desire for higher education, evidenced by the class of scientific subjects which have been discussed in the dental journals for the last year. Dr. Arthur Black's statement "that the dental profession faces the greatest opportunity in its history of demonstrating its value as a part of the great healing science," is well founded, and this paper is an indication of the desire for a greater knowledge of the basic principles of medicine on the part of the members of this society.

There is one great fault with this paper! It attempts to cover too much ground. Any one of its subheadings is sufficient for a whole session. It is not my purpose to attempt to criticize any part of what the essayist has said but simply to call to your attention some few phases of the subject that I believe of interest.

If we are to prepare ourselves for more thorough knowledge of diseased tissues of the oral cavity, we must systematize our methods. The lips are the first in order, and of great diagnostic importance. Mouth breathers usually have lips that are thick and coarse, so also do cretins. They are parted in idiots, in some forms of insanity, and in great bodily prostration. In

anemia they are pallid. When dry, they demonstrate diminished or perverted oral secretions, also obstructions of the nasal passages.

The presence upon the lips of aphthous ulcerations, mucous patches, sores, is an indication of conditions within, and clefts or ulcerations at the corners of the mouth, or scars resulting from the same are of great diagnostic importance, suggesting, especially in young children, hereditary syphilis.

Epithelioma of the lip shows itself as an irregular circular or oval ulcer with a swollen or infiltrated base, usually on the lower lip, and develops from a fissure or wart.

The tongue, its color and appearance, is certainly of diagnostic importance to the careful observer as an indicator of disturbed systemic conditions. A white-coated tongue denotes febrile disturbance; a brown, moist tongue indigestion; a brown dry tongue indicates blood poisoning, depression and typhoid fever; a red, moist tongue, feebleness and exhaustion; a red, dry tongue, inflammatory fever; a red, glazed tongue, general fever; a yellow, furred tongue, bilious disorder; a moist, flabby tongue with imprint of teeth at sides, usually indicates general anemia; a tremulous, moist flabby tongue with a blue appearance, tertiary syphilis.

The gums are pale in all forms of anemia, red and spongy when ill cared for. In cases of tuberculosis, diabetes and alveolar disease a narrow red line along the margin of the gum is often seen. The typical narrow bluish-black line along the gum margin in lead poisoning needs no description.

Our observations should certainly extend to the pharynx, as pharyngitis is common and often the forerunner of greater ills. The tonsils, with the continued presence of diphtheritic bacteria present, suggest the necessity of proper care by the dentist. Oftentimes, in adults, the presence of diphtheria pharyngitis is unsuspected, being usually mild in form, yet the danger of infection to the young cannot be too carefully guarded against.

The essayist is to be complimented upon his clear exposition of the other diseases that should be looked for by all dentists who desire to serve their patients to the greatest good.

DR. W. C. McWETHY, Dixon:

I do not stand here as a specialist or as an oral surgeon

or anything of that kind, but I simply gave permission to the Program Committee to use me as an ordinary dentist or as a general practitioner willing to make a few remarks upon this subject. I believe the dental profession is lax along the line of diagnosis and possibly in treating some of these diseased conditions of the soft tissues of the oral cavity. The essayist stated something to the effect that it is a lamentable fact that the medical and dental professions are separate. I do not feel that way about it. I am proud of the dental profession as a profession standing upon its own foundation and with its own courses of study, but there is always opportunity for improvement, and the colleges are improving rapidly, trying hard all the time to bring about a higher standard of dentistry along the lines that have been stated, and to delve less into the past.

We also see now in the distant horizon of 1917 the possibility of four years in the dental course which will give an opportunity no doubt to devote more time to these subjects which in the past have been too lightly skimmed over. It will enable students to delve more deeply into them, and dentists graduating in the future will be more capable to deal with the diseases of the soft tissues of the mouth. If I were to venture a reply to Dr. Smith as to why we have not given more attention to the soft tissues, I would suggest that it is probably because we are called upon less frequently to treat diseases of the soft tissues. On the other hand, I do not think our remuneration is so great for treating diseases of the soft tissues as for treating those of the hard tissues.

In speaking about tumors, cysts, epulis, and so forth, I believe the dentist should be able to diagnose them and treat such of them as come into his sphere. I mean by that such of those as are closely related to the dental organs. He should be able to diagnose them and be able to know when to stop. We do not want to be general practitioners of medicine and dentistry both, and we do not want to turn these cases over to a general practitioner of medicine, but they are cases for specialists to deal with. The general practitioner of medicine has no more business to treat diseases of the oral cavity than a general practitioner of dentistry. I would plead for a better

knowledge among dentists so that they will know and understand the conditions.

Very early in my practice I met with an old gentleman who came into my office and who had an enlargement over the left upper lateral incisor about the size of the end of a man's thumb. The cold shivers ran up and down my back, as I did not know what was wrong, but I applied a local remedy, the least touch causing a profuse hemorrhage. I made another appointment with the man, consulted Marshall's Surgery, located the condition, and with the assistance of a ligature and a saturated solution of trichloroacetic acid I removed it, so that I could go ahead and extract the roots and make a plate. This I did, and he is wearing that same plate. I was successful in treating that case. I looked through the books more and more, and I know now that I removed an epulis or a pretty good sized tumor.

While I am standing on this platform I wish to say that I do not think that we should have as many vacant seats as we have here this afternoon. Unless the men who are absent know a great deal about these things and are able to diagnose them, they should be here and listen to such a paper as we have had, and particularly to such men as Dr. Gilmer, Dr. Brophy, Dr. Buckley, and Dr. Logan. If they were here they would get a good deal out of this paper and the discussion.

As to syphilis, it is outside the realm of dentistry, but we should know how to diagnose it. We ought to know it when we see it. With the modern apparatus of sterilizing which we ought to use in our everyday routine practice, there is not very much danger of our causing infection, and yet there is a possibility of it.

I would plead for a greater knowledge among dentists and a more enthusiastic study of these various conditions of the mouth. We should take every opportunity to listen to such papers, to read books and try to be capable of performing such surgical operations as may be necessary in the cases that come under our care.

I believe in the college. I have been out of school now for several years, but I firmly believe that we are getting more real oral surgery taught today than was the case when I was a student. I think every individual student, if it is possible, ought

to be called upon to perform some sort of surgical operation under the direction of the oral surgery professor or his assistants. He should perform one or more or perhaps several operations, and dress the wounds, and care for them afterwards, so that he will be better fitted to cope with the troubles that are liable to drop in on him, so to speak, at any moment.

DR. TRUMAN W. BROPHY, Chicago:

The paper that has been read by Dr. Smith has covered an immense field. The field is really so large that I am afraid I will get lost in it before I get through if I undertake to discuss the various points in it.

First, the tongue, that very important organ which is the index of the physician and upon which he relies to a great extent in making a diagnosis of the many ills of the body. In his work on "Diseases of the Tongue," the late Sir Henry T. Butlin, president of the Royal College of Surgeons of England, has dwelt at great length. It was my pleasure to have known him quite well. He offered me access to his wonderful drawings on the diseases of the tongue, executed by his celebrated artist. He placed in my hands on leaving England two years ago some beautifully executed water color paintings which he had made for me. These I am now using.

I could not for a moment attempt to speak on the various diseases of the tongue because it would take too long, but those which appeal to us mostly and to the dentist for his consideration are due to local irritation brought on by broken teeth, decayed teeth, badly adjusted crowns or plates or bridges which lacerate the tongue and lead to the development of malignant growths that terminate in the death of the patient. Perhaps there may be some here who do not know that the illness which led to the death of General Grant was due to a tooth the edges of which lacerated the side of his tongue. Dr. Frank Abbott, who at that time was the dean of the New York College of Dentistry, was the dentist of General Grant, and he told me how the general came to him and how he informed him that this laceration might result very seriously; but the general continued his smoking, almost constantly, and allowed his broken tooth to remain, having had the broken edges filed down. Malignant disease developed. These irritations in the mouth resulting from a

broken tooth or teeth, diseases of the teeth from abscesses, or from anything that may produce irritation, may lead possibly to malignant disease. I hold that nearly all growths are the result of irritation of some form. Irritation leads to the multiplication of cells, which may be fibrous or epithelial or of connective tissue. They may be of glandular tissue or what not, and so we have developed a tumor.

I have a case now of carcinoma of the tongue which I expect to remove in a few days. All treatment in the way of local applications to the tongue has proven useless, so that there is nothing left but the extirpation of the tongue.

The doctor spoke of cysts. These cysts are found more numerously than the average practitioner realizes. In my clinic every Tuesday afternoon we have many cases of cysts, and had I known I was to speak on this subject I would have shown a remarkable collection of these.

I wish to take issue with the author of the paper when he speaks of cystic tumors. The condition must be either a cyst or a tumor, for a cyst is not a tumor, and a tumor is not a cyst. Although we may have a tumor developing with a cyst or complicating a cyst. A cyst has a cavity containing fluid. A tumor is a neoplasm, a new growth, the development of cells and a growth. I repeat what I said recently at a meeting a definition given by William H. Van Buren, and in my opinion, if one observes it carefully, he will never confuse a cyst with a tumor. Dr. Van Buren said that "A tumor is a local, limited enlargement taking place in any part of the body and consisting in its substance of an outgrowth of new tissue which has no physiological purpose in its growth."

If one analyzes that definition he cannot possibly confuse a cyst with a tumor nor can he confuse a tumor with anything else. The old word tumor implied enlargement, so that the old definition would create a confusion with a swelling. A dental abscess with a distension of the cheek was formerly looked upon as a tumor, but it is not a tumor. A cyst is a cavity containing fluid, and the confusion that sometimes arises in making a diagnosis of a cyst leads to serious results. For instance, a student may mistake a cyst for an abscess. I recall an instance where a student did not quite know, he called the demonstrator

and the demonstrator said, "Yes, this is an abscess. We will open it." It was situated on the inside of the hard palate back pretty well toward the tuberosity. Without any further explanation, he thrust a knife into it, and blood escaped. It was found the patient had an aneurysm of the posterior palatine artery that extended forward from the hard palate almost to the anterior teeth involving that portion. He plugged the posterior palatine foramen and the hemorrhage was arrested.

I do not think the essayist said anything about the treatment of these conditions; but the possibility of confusing a cyst with an aneurism or with an abscess is very great. I would suggest that you should never open anything like that without using an exploring needle and testing the fluids within.

The essayist showed a beautiful dentigerous cyst, the nucleus of which was a lower bicuspid tooth. These growths attain enormous size, and great quantities of bone are sometimes lost by reason of the pressure of the cyst wall.

The most common tumor we have in the mouth is epulis. It is composed of fibrous tissue; it develops from the periosteum and involves the gum. The name is a misnomer, like many other names we have to deal with. It is not upon the gum at all. The gum is implicated or drawn into the growth, so to speak, which proceeds direct from the periosteum and extends up and includes the gum in its development. It seems to come from the gum, but it does not. It is necessary to go down to the bottom and take out the periosteum and a little of the bone along with it, and in this way get rid of the tumor. Sometimes it is necessary to remove the teeth themselves because the pericementum may be involved in this growth. We cannot successfully remove the tumor until we remove all the tumor cells.

Let me mention a recent experience in this connection. As a matter of precaution, I will say that in pregnant women there are distensions and swellings or thickenings which develop along the festoons of the gums which strongly simulate epulis. There are two forms of epulis, the medullary and the fibrous, the soft and the hard. They are quite different. You may say that this is a case of epulis in a pregnant woman because it is upon the gum; it is of the gum and not of the periosteum. Such is a true

epulis. The festoons of the gum become distended and full and reach to the edges of the teeth.

What are you going to do about it? You should not subject the woman to an operation in her pregnant state. You should make use of astringents. The remedies I have used for years consist of tannic acid and glycerine, ten grains to the ounce, applied to the gum. This astringent will contract the condition down to normal approximately, although it will not be restored to exactly a normal condition. You should use extreme care in removing all deposits that gather around the teeth and under the mass of tissue, and wait until the period of gestation has passed when the growth will disappear. During the period of gestation there is a tendency on the part of the tissues to proliferate cells, and here, once they get started, resulting from irritation, they develop as they do elsewhere. With such treatment the mouth will assume a normal condition without surgical operation. Surgical operation in such conditions would be very wrong and uncalled for.

As to Ludwig's angina, it is a subject which requires careful study. It is a deceptive disease. It is one about which I presume more mistakes are made than in anything else. It is a disease that has not been very well understood. It is now receiving a great deal of attention on the part of laboratory investigators and surgeons. Why this development of tissue and swelling takes place has not been fully understood.

Syphilis is one of the diseases that is on the increase, and does more harm than any other disease known. The illustration the doctor placed upon the board should be a warning to all. When a policeman at the crossing of a street puts up his hand it means stop. It seems to me, if this picture could be placed before the youth of the world, and the youth were compelled to look at it, particularly this vicious looking ulcer on the hand, it would carry its own lesson. If that were done, the world would be greatly benefited.

We have a condition of the tongue, of the cheeks, of the lips, which is associated oftentimes with leucoplakia, which is often a precursor of carcinoma, and may not a syphilitic lesion often be the precursor of a carcinoma on account of the development of this leucoplakia, the condition being aggravated by smoking

tobacco, burning, etc. Some men will smoke a cigar until the lips actually burn, and then they develop carcinoma. There is leucoplakia first, and then a development of carcinoma. Leucoplakia is always a dread to us because I regard it as a menace to the life of the patient, and the sooner it is removed the better. This, I believe, is often produced by the use of tobacco, irritants to the parts, and so on.

Before I close my discussion I want to relate one incident. Something like twenty years ago I was asked to speak before the Tuberculosis Congress in Chicago. At first I declined on the ground that I was not prepared to speak on that subject; that there were a great many men who know more about it than I. They insisted that I should speak on tuberculosis from an oral point of view, and after a good deal of persuasion I did, and among the various things I told them was this, that oral infections were of so great an importance to the people that I ventured to suggest that the government, city officials, municipalities, should abandon the use of the common drinking cup in the public schools. At that time I had a school boy under treatment who had contracted syphilis. He had an extensive ulceration of his lips and cheeks. His upper lip was nearly gone before he was dismissed from school. He had been drinking from the same cup from which the innocent children drank. You can readily understand that a little boy or girl might have a fissure of the lip or a cold sore and in drinking from the same cup this boy used might contract the disease in that way. I said that these cups should be abolished. I likewise told them that the blankets used on Pullman cars should be covered, so that people would not be obliged to sleep under blankets which had covered tuberculosis patients the night before without some protection.

Sanitation is the very foundation of our work today, and I said at that time that if women cut off their skirts and not have them any nearer than four inches from the ground it would be a good thing. They would not then be dragging or stirring up the dust as they often do and carrying dirt and disease germs in their homes. They laughed at me and the papers took the matter up and made a good deal of fun with reference to my ideas of sanitation. But what is the condition today? You know very well. Women are not satisfied to make their dresses four inches

high from the ground, but they make them eight or ten inches, and they now feel it is all right. There has been a great advance along the lines of sanitation in the last few years.

Dr. Smith (closing the discussion):

I have enjoyed the discussion very much, and I am very glad the gentlemen have been so lenient with me. I am not an oral specialist as I said in the beginning of my paper. I have been asked to see cases in consultation with physicians that I ought to know about.

Dr. Brophy spoke about cystic tumor. I meant in appearance (a ranula has the appearance of a tumor), yet it is a cyst as we know.

I do not believe there is anything further I have to say on the subject. I thank you.

DISCUSSION ON THE PAPER OF DR. PRICE.

DR. DON M. GALLIE, Chicago:

I am sure the members of the society have been profoundly impressed with the message brought to us by Dr. Price, and we must realize the wonderful work that he and his commission are doing, and everyone must appreciate that Dr. Price in order to carry on this work must be sacrificing much time, energy and money.

He comes here to Illinois to ask us to help him to carry this burden and to work out some means by which the great problems which confront us today can be solved, so that we can meet with the medical profession to discuss many of the diseases that are traceable to the oral cavity. He has told us something about the support he is receiving, and he hopes that Illinois will take her place among the other states in the Union in supporting this commission appointed by the National Dental Association.

I had the pleasure and great satisfaction of being with Dr. Price in some of his missions when he solicited aid from some of the prominent men of this country, and his message to them was well received, and some of those whom he consulted and advised with said that this was one of the most wonderful pieces of work that had ever been undertaken. When he presented the question to Dr. Ludwig Hektoen, of Chicago, Dr. Hektoen said that such a movement would meet with the hearty support and

co-operation of the medical profession, as well as receive support from the great philanthropists of the country. To show that the dental profession is back of this very great movement, it is the desire of Dr. Price and of the commission that he shall carry a message back to show to the people that we are vitally interested and liberal contributors to this great work.

You and I are not able, as Dr. Price has said, to carry on this work and attend to our daily professional duties. It is not work that can be carried on between supper and bed time, because the average dentist is tired in mind and in body at that time and he must have a few hours' rest so as to be ready for the next day's work. Someone has got to do this research work. The idea is that this commission shall do for the dental profession what the Carnegie and Rockefeller Institutions are doing for the medical profession. He has told us that the State of Michigan has contributed \$4,200; the State of New York \$7,000, and the little State of Ohio almost \$12,000, the city of Cleveland, where Dr. Price lives, contributing nearly \$5,000 to this work itself, which conclusively proves the old saying, "that a prophet is not without honor except in his own country" does not hold good in this case of Dr. Price. The associates of Dr. Price in Cleveland have faith in him. They are familiar with the work he is doing and they are heartily supporting him in that work. Illinois has contributed \$2,400 up to this time. That amount is good as far as it goes, but Illinois is one of the big states of the Union and should contribute more liberally than it has done at present to this great movement. We expect more of Illinois. We are up against a proposition to solve. The medical profession has passed the buck to the dental profession and it is up to us to show that we can take it and will not have to pass it back. You will pardon the slang in illustration of this point. I know it is the desire of everyone here to show the medical profession that we are capable of handling this problem of our own. Yesterday I made the statement that the dental profession of the country, consisting of 40,000 dentists, were not liberal contributors, and I do not believe that the average dentist outside of the money that he contributes for dental society dues, for dental literature, or journals or any apparatus for the needs of the office, gives \$5.00 for other purposes, and several members who

heard me make that statement thought I placed the figure too high. Stop and think what that means. We are far better off than the average members of the medical or the legal professions, and there is no comparison between our success and the compensation that we receive and that of the teacher and the preacher. I read recently a report of the graduating class of Yale University. The graduates started out with \$600 for the first year, and at the end of ten years the average was only \$4,000 per annum. Dentists as a class will beat that. Let us consider for a moment what engineers contribute each year for literature and for devices to carry on their life work. They are liberal contributors as compared with dentists. Members of the medical profession find it necessary, in order to keep up with the progress of medicine, to buy new books or treatises every month, and if they do not do so they fall helplessly behind in the treatment of disease. The lawyer has to spend liberally for books in order to keep up with the new laws and decisions rendered by different courts, and so does the up-to-date preacher have to spend considerable money in order to be well informed to carry on his work.

When Dr. Price comes here and asks you to support this movement and to be as liberal as you can, he is not asking you anything more than he should, and it is to be hoped that the members of this society will respond liberally. This morning we succeeded in getting \$7,700 in subscriptions up to date. It means so much a year for five years, and these amounts will run from \$5.00 up to anything that a dentist feels like giving. There are a number of men in the country who have already subscribed \$200 a year for five years. There are a greater number who have subscribed \$100. Many have given \$50, and the number who have given \$25 down to \$5.00 is legion. There are a great many who have promised to subscribe \$5.00 a year for five years. All of these small amounts will be gladly received and the contributors of these amounts will receive just as much credit as those who contribute \$25 or \$100 because we realize that they are giving it with a good spirit. It is not a question of the amount you subscribe, but it is the spirit back of it, and I would impress upon you that if you cannot afford to give \$10.00 a year, give a less amount, or if you can afford to give \$20 a year do so.

I do not believe there is a man in the profession who will not in some way be able to contribute to this splendid work.

I am not going to enter into a discussion of the scientific side of this subject because I am not competent to do so, but I simply urge you and appeal to you to place Illinois in the front rank of the big states in this great movement. I want you to place Illinois alongside of Ohio and the State of New York. (Applause.)

DR. JOHN P. BUCKLEY, Chicago:

It hardly seems necessary to indulge in any further discussion of this most excellent lecture by Dr. Price, but there is one thing that the men who are interested in the progress and reputation of the Illinois State Dental Society wish, and that is to make our society take the position that the other societies have taken in regard to this work of the National Dental Association and the Scientific Research Commission thereof.

Dr. Price has told you that the State of New York has already contributed \$7,000; that the State Society of Illinois had only contributed up to this meeting \$2,400; that the State Society of Iowa had contributed a like amount, and the State Society of Ohio, where they know and love Dr. Price, had contributed on an average of about \$10.00 a member, making approximately \$11,900.

I would call your attention to the fact that the National Dental Association in two instances, at Kansas City and at Rochester, has given the State of New York and the State of Illinois the highest vote for trustees of these two respective states. Not because of the personality of the men; but because of the standing numerically and professionally of these two states. As a trustee of the National Dental Association chosen by you, I would like to have you stand back of the president of the National Dental Association, one of our own members, and your trustee, so that we can go to San Francisco and say that the State of Illinois has given as much per member as has the State of Ohio. That is our idea, and that is what we are going to accomplish.

In the president's address yesterday morning reference was made to indigent members of the profession, and an ex-president of the society, Dr. Corbett, referred to a pathetic instance here

in our own state. He told us of the financial condition of one of our beloved members who had passed to the Great Beyond, and how his son, a member of our own profession, and also a member of this society, in his early manhood likewise has passed the Silent River, leaving a widow with a child to support, and not only that, but to pay the debts of the young man which were accumulated because of his recent illness. That old man, whom you and I loved, gave his life not only for his family, but he gave his life for dentistry. I know, and you know, how, when he was on the Illinois State Board of Dental Examiners, he worked day in and day out to bring about to perfection a hobby of his—antomical occlusion.

When this research movement was started I was not in full sympathy with it. I did not believe in my own heart that it was the best way to develop scientific research work. I believed at that time that investigators were born and not made; but in the short space of time that has elapsed since the organization of this scientific commission, whether I fully agree with the movement or not, I am in sympathy with it now. I am in sympathy with the motive, and I am going to do all I can to support and back up this undertaking. (Applause.) This does not mean because we are going to try to develop scientific investigators that you men, who like to do scientific work, need to stop. You can go on in your own way; you cannot stop certain men from delving in scientific work as a side issue to the practice of their profession whether you want to do so or not. We want every man that has ambition or desire or an inclination to do scientific work to go on and do it, but we want every member of the dental profession, whether engaged in scientific work or not, to give his loyal support to this scientific commission of the National Association.

We have an old man in Chicago, eighty-nine years of age, who has given his life to dentistry, and he has to practice dentistry in order to get three meals a day and a place to sleep. We have dotted all over the country graves not marked by a stone or lettered monument which symbolizes affection of surviving friends. The winds of summer rustle over those graves; the snows of winter hide the spots where the remains repose. We want in the future to avoid these pitiable conditions that

exist in our profession today. We want to encourage just that kind of movement which was born in the brain of Dr. Weston A. Price, of Cleveland, so that if we foster that development, we can depend on that great organization to do for us the work that needs to be done. Then men need not necessarily sacrifice their lives for their profession.

Dr. Price wants, first, the members of the dental profession to show the wealthy men of this country that our profession is willing to do something for themselves. It is his aim to go, after he has this magnificent board to which he has directed your attention, to men of wealth and say, "This Scientific Commission of the National Dental Association is endeavoring to accomplish a certain definite purpose, but in order to do that we need money, and we know that you have been liberal contributors to other institutions and to other charities and the like, and we want you to give some money to us for this work." Dr. Price has already gone to men of this kind and one of them said, "How much money has the dental profession contributed to help along in this work themselves? Do they, the members of your profession, recognize its need, and are they contributing something?" Dr. Price wants to be able to say, "Yes." The Illinois State Dental Society, for instance, which has a membership of about 1,800, has contributed \$18,000 alone. Other state societies are doing as well." That is what Dr. Price wants to be able to say to these men of wealth from whom he expects to get these contributions.

Do you know anything about the life of Russell Sage? Let me tell you one thing about him in which I am sure you will be interested. Russell Sage went home tired one evening and he said to his dear old wife, "I do not know how to spend money, and I am not going to try. All I know is how to make money, and I am not going to try to spend it. I am going on to make as much as I can as long as I live, and when I die I want you to spend it for me." He went out into the kitchen one day and the maid had broken one egg in a saucer to feed the cat. She had another egg on the table. After she had broken the first egg, she picked up the second one, and just then Russell Sage came in and said, "What are you doing?" The maid replied, "I am feeding the cat." Mr. Sage said, "I see you are. What are you going

to do with the second egg?" She replied, "I am going to give it to the cat." Mr. Sage said, "Wait, Mary. I saw you break the first egg in a saucer and give it to the cat. If the cat eats the first egg, sits down on his haunches, twists his tail, licks his lips, and looks up, you may break the second egg. But, on the other hand, if, after having eaten the first egg he walks over to the sink and lies down upon a mat, you do not need to break the second egg. You can save that egg."

Russell Sage saved eggs by means of which he accumulated money. He could not spend that money, but his wife, acting on a suggestion after his death, spent a large sum of it in establishing what you know to be the "Russell Sage Foundation," located in the city of New York. So I believe every member of this great society wants to make an active effort and put as much energy and thought and as much money as possible into this Scientific Commission. That is what we want you to do, and that is what we expect you to do. (Applause.)

DR. FREDERICK B. NOYES, Chicago:

If you will stop before you put down your subscription and think what ten cents a day would mean and how many of you spend ten cents a day on an average for which you do not get very much; if you stop to think of what any one thing that you do in any day's operations has cost somebody in scientific research to develop; if you stop to think of the economy which the one item of the Tungsten will allow; if you are purely selfish and want to make an investment in the interest of economy, I think there is probably nothing that in the next fifty years will save the dental profession more money than a scientific foundation. I think enough has been said already on that topic, but the committee is going to keep up this fight until they have gotten a response from practically every member of the Illinois State Dental Society. We must have the hearty support—at least to some extent—of practically every one in the organized dental profession. I am not going to say another word about the financial end of it; but I do want to say something about the other end of it, for no matter how perfectly endowed such a research commission may be, the usefulness of the results of it will depend upon the individual members of the profession. Good cannot reach the community unless the dental practitioner is able

to absorb the results, and in order to have that happen the individual members of the profession must take into account their preliminary training, they must review their fundamental sciences, so that they can take the reports of scientific research and read them intelligently. That means effort in every locality. It means effort on the part of every individual in the profession; it means a reorganization for many of us of the hours after dinner. It means the arranging of ourselves into groups meeting at definite intervals, so that we may have the advantage and stimulus of each other's efforts to brace up our own, and still more important than that, we need to have men springing up all over the country interested enough to work and willing to avail themselves of the opportunity to do work, knowing that they will have perhaps not as much return financially as they might have in some other way, but knowing at the same time that they will have a safer and surer return, and consequently being willing to devote the time and energy and ability which they know they have to these lines of research. If we are to find these men among our profession over the country, we must have some means of getting them and making them available and bringing them to light. A man that is hidden will do us no good. We have got to find him and we have got to organize throughout the country some means that will find those men. The dental profession has not yet begun to organize the machinery for the equipment of the individual members. It has not yet begun to develop those things which bring about advanced study and which bring about progressive work. So far the dental profession has been blessed with a few men of very brilliant ability who have achieved wonderful things in a scientific line, and whose achievements are well known to the entire profession. Miller, Black, Wells—those brilliant men have shed their light over the entire profession. The work in scientific lines has been done for us and handed out to us, and we have not been developing the means of training men to take their places in this work. Those brilliant individuals have sprung up because of that inherent quality which pushes men forward—those qualities which drive men on to work in spite of all difficulties, and there are always some men who will rise in spite of every obstacle. But we have not done much to stimulate

those who have had desire, but perhaps not sufficient energy to overcome the almost insuperable difficulties. It is undoubtedly true that the very character of the work of dental practice is such that it does not encourage individual reading and research. The medical man, while he sometimes does hard enough physical labor, yet he does not have the everyday round of physical and nervous exhaustion that the dentist has, and consequently, in the very nature of his practice the dentist has not a great natural inclination to read and study, and it is going to require greater effort on part of the dental profession to meet the conditions which present to us at the present time.

I feel that we have spent more time than we should on this subject, but I am proud of the response that has come from this great society.

DISCUSSION OF DR. ALSIP'S PAPER ON "ANALGESIA."

DR. GRAFTON MONROE, Springfield:

Analgesia, by a combination of nitrous oxid and oxygen, is a boon to the intelligently careful practitioner of dentistry. I say intelligently because some men may be considered careful and they don't know why. This intelligent use of the boon of dentistry for the elimination of pain may come by long and observing practice or it may be acquired from acknowledged sources of information. I agree with the essayist that every well equipped dental office should have a good gas outfit and an exceedingly careful operator to direct its use. I do not believe that "a witty speech or an amusing story" goes nearly so far as the proper use of thoughtful suggestions along mental lines which few can doubt as exerting a beneficent influence. Just a word might be dropped here as to the baneful results of indiscreet talk by parents to children about the horrors of the dental chair and it should be our duty to give parents and even children some plain talk of how much harm they do others by their talk of the experiences at the dentist's.

But the elimination of pain is our real subject and that should be one of our highest aims. It is in the most difficult cases where analgesia comes in as such a boon. The safety of analgesia and even pure nitrous oxid has been its salient feature to me. I have, however, had some physicians express their fear of it and say that *I* would some day have a big scare, then

I would wake up. Intelligence in its administration is a prerequisite and we should lose no opportunity to store up for future use little suggestions which will aid us in its even safer administration. I have lately been helped by what is known as the *Schtange test*, and it should be welcomed by all anesthetists, because of its simplicity and also because it should help the patient's confidence in the operator from his evident carefulness before operating.

This test is based on the fact that a healthy person can suspend breathing from thirty to forty seconds—this evidently depends not on the lung capacity but on the vigor of the heart muscle. In persons of weak heart the time is shortened to twenty or even ten seconds.

The patient seated in a chair, is told to make a moderately deep inspiration and with mouth closed, to hold the breath as long as he or she can. The shorter the time they can suspend breathing the greater the danger; and if the time is less than twenty seconds the anesthetic should not be administered—if this test fails where you think it should not, then put off the operation for another time when there is less excitement and try the test again.

I think I am right in saying that many surgeons (notably Dr. Crile of Cleveland) use the short gas administration for a day or two before any real operation, giving the patients a restful confidence in what ordinarily they fear so much—or else they use some medicine of nerve sedative value or slightly narcotic—such as *bromural*, which is very useful before the anesthetic.

One of the conditions that should be insisted on, though I confess it is sometimes difficult to obtain, is that the presence of parents or immediate family connections should not be allowed. The operator should not be hampered by the questions that can come from the laity at the time when such operations are being performed. Along this line I would like to quote from an editorial in the *American Journal of Surgery* which says: "It is imperative that the medical practice acts of various states be so amended as to abolish the present menace of the nurse-anesthetist and that medical actions should question the ethical standing of those surgeons who persist in employing a lay anesthetist in the presence of competent licensed practitioners

who are ready to shoulder the work and the responsibilities that go with it."

In the not far distant future I hope that there will be established under the auspices and direction of this society—not an advertising business—but a department of instruction headed by competent practitioners or teachers of anesthesia.

This department will make it possible for every community of dentists to have one or more of its members become expert in the administration of anesthetics. Then the double task of operating and watching the anesthetic effects will be removed and the dentist while operating can be more at ease. The plan for such instructions could be worked out by the teachers. Great strides have been made by the methods of this society in prosthetics, why not likewise in anesthetics?

The essayist mentions some of the signs that should act as guides in the selection of patients best suited for anesthesia. The Schtange test should be considered here. To the average patient the carefulness of the operator is and should be productive of confidence and following this carefulness—if it is possible to do so—the anesthetic should not be given at the same sitting. This of course applies to a case where the dentist and patient are practically strangers to one another. The wonderfully pleasing effects of the use of analgesia is its power to win patients if they once use it and its use while operating on timid children when the timidity is once overcome, will make them your lasting friends and will create a current of popularity that will bring others for its administration.

J. S. REECE, Bloomington:

When about sixteen years of age and living on the farm I became the owner of one of those painful felons, on my right thumb. The tissue was green some distance from the seat of trouble, my arm swollen to the shoulder. The pain, at times, was almost unbearable. I called upon our family physician, who on examination of the thumb told me he would have to open it. To him that may have been pleasant but to me it was anything but joy. When about in the act of following out his decision I entered a protest, saying that it would be impossible for me to stand that. "O," he said, "that will not hurt you very much!" But I felt I knew better and still objected. He then took me

into the back room and told me to lie down upon the couch, which I did. "Now, we will do that and not hurt you," he remarked, giving me at the same time a little chloroform on a handkerchief. After a few inhalations and while I was still conscious he took my hand and quickly opened the felon and pressed out the offending corruption. I knew all the time what he was doing and yet felt practically no pain. That was analgesia by the use of chloroform. Great was the gratitude in my heart to the doctor for alleviation of this pain and he has been graciously remembered to this day by that suffering boy. My confidence in him, my respect and love for him was increased more than words can express.

Such has been the experience of many patients who have been kindly treated by the administration of Nitrous Oxid and Oxygen by a careful and thoughtful operator for the painful operations of cavity preparations as well as other minor operations.

Exceedingly grateful ought we to be that the Allwise Creator has given us something to use to alleviate suffering. We surely live in the greatest age of all ages. Again I say let us be glad that it fell to *our* profession to first discover and use these wonderful gases and all honor to the men who discovered them and their uses.

In February, 1912, I spent some time in Chicago with Dr. Ream studying Nitrous Oxid and Oxygen as an anesthetic. I also was with Dr. Barber some. One day the latter administered N_2O and O to me for the preparation of some very sensitive cavities. While under its influence—and feeling very comfortable—I well remember saying, audibly, too, the Lord is surely kind to give us something that will alleviate pain like that. I have since that time had a good apparatus for the administration of N_2O and O in my office and would not think of practising without it. First because of the experience of cavity preparation in my own teeth with it, and second because of the appreciation of its use by my patients, to whom I have given it with great satisfaction to them as well as myself. Almost every patient to whom I have administered it has had nothing but kind words to say in regard to it, and many of them would not permit any work done now, that would cause much pain, without its use.

Dr. Alsip has well said that "No operator should depend wholly on one drug or a combination of drugs for the elimination of pain." He should use, of the several at his disposal, the one that his best judgment suggests for the case in hand. The patient might seriously object to the use of nitrous oxid and oxygen and prefer something that does not sound like an anesthetic. Here the operator must do that which will be best for his patient, and himself as well. If desensitizing paste would do the work I would use it or anything else that accomplishes the purpose, at the same time considering the comfort of my patient. There is an anelgesia remedy which the doctor did not mention that works with effectiveness in some cases. To illustrate: A patient with a carbuncle on his neck consulted a physician, a friend of mine, for relief. After careful examination the physician said the carbuncle would have to be opened. The patient thought that not necessary, and told the doctor so. Immediately the physician stepped before the patient and said, "Now, who knows more about this, you or I?" The patient of course at once humbled himself and acknowledged his superior—at least in this—and said, "Why, you, doctor, of course, do as you think best." The physician with carefulness and professional discernment opened the carbuncle with little pain to the sufferer. Some times a decisive word or a proper suggestion, with or without the use of drugs, is very helpful. But where there are very sensitive teeth to work upon, of all the preparations before us today, nitrous oxid and oxygen in the larger percent of cases is the most efficient and successful, it seems to me. The dentist who does not acquaint himself with some of the preparations and methods used today to alleviate pain as well as the fear of pain certainly is a back number, for there is little need of causing dental pain in this day. Let me say right here though that sometimes it is better to endure a little pain than to be relieved of it.

The doctor has well said that great care should be used in determining whether it is wise to administer these gases to the patient about to be operated upon. He has enumerated some of the indications that might lead to trouble and any one of which is a warning to the anesthetist. Overlooked, any one or more of them might lead to serious trouble. The thoughtful, careful anesthetist, the one who is always thinking of his patient's

best interest as well as his own, is one who has prepared himself well for his work. We must remember that no matter how fine an equipment we may have it cannot work itself nor take the place of the anesthetist. In other words, brains must play a big part in the success of this procedure. He who attempts this work without considerable study in every particular is no less than a criminal and ought to be branded as such. "Nitrous Oxid and Oxygen is no plaything." While it is considered the safest material for either anesthesia or analgesia yet it is about the hardest to administer. That with any anesthetic there is always an element of danger, we cannot deny. In analgesia great care must be used. I am not a specialist in this work, but my own experience, as well as knowing something of the experiences of others, leads me to understand that we cannot be too careful in the use of this agent, even in analgesia. So he who is about to begin the use of N_2O and O , if he has not already done so, needs to pretty thoroughly acquaint himself with it and the apparatus. It would be wise, too, for him to select a reliable person with whom to study. I well remember the work of an agent from a dental house in the demonstration of a machine in my office before a number of dentists. He seemed to know little about the business. I want to give due praise to our dental houses and manufacturers for the great work they have done for dentistry in its many phases but some of their agents sent out are for the sole purpose of commercial gain and are not equipped with the proper knowledge they should have. Neither are all dentists peculiarly fitted for this kind of work, but with proper training most can become so.

The doctor has truthfully said that frequently we have to combat the fear of pain and the dread of the operation as much as the pain itself. I remember a lady patient who one day came in for the care of several decaying teeth. She was very nervous, excitable, and sat ready to grab my hand every time I made an attempt to touch the tooth. I finally explained to her what could be done with nitrous oxid and oxygen and asked that I might use it. With some little hesitancy she consented. She was so concerned that the perspiration stood out on her face. I pitied her. She took the N_2O and O very nicely and I did the work without pain to her. About two weeks ago she phoned me

that she had some work to be done. "Now, doctor," she said, "you will have to use that nitrous oxid again; I cannot have it done without it." She came in, sat down in the chair with seemingly perfect calmness and remained so while we prepared several cavities under analgesia. After the work was completed she arose and left our office without any sign of weariness or nervousness. The second time there was little or no fear. With such a type of person as this I say this is surely a marvelous thing. Fear keeps many from having their teeth cared for as they should. Pain finally drives them to the dental office and then how they suffer, mentally and physically. Now, if the dentist does not use something to relieve their suffering the patient is often worn out, as is the operator, when the work is complete.

Our essayist emphasized the importance of evenness of administration because other than evenness of administration often causes nausea and other disturbances. Too much force in the beginning of the administration produces excitement and shock very often. Gentleness, where it is possible is very greatly appreciated by our patients and they therefore gain confidence and trustfulness in us, and the result is that there is an easier control of the patient throughout the entire administration. Force is necessary in some cases but not in the majority and these little acts of kindness and gentle dealings reward us very materially.

I agree with the doctor that all administrations should be as short as possible for the patient's sake as well as our own. Everything should be ready and work done as quickly as is possible. I would like to add a word of warning here in our quickness of operating. We must remember the bur will produce heat just as quickly under analgesia as when it is not used and the tooth may be overheated to such a degree as to injure the pulp, which may cause its death. We must use our eyes and knowledge of the anatomy of the tooth that we may not approach too near the pulp unless it is necessary.

I have had more deaths of pulps from other methods than when using analgesia. In any of our methods once in a while a pulp will die even for the best operator in the land. But we must guard against carelessness and emphasize carefulness.

As to the blood test I have little to say as I have not made that a very serious study and still I recognize its importance. We see this high blood pressure many times in life. There was some high blood pressure, possibly, when some of us were about to propose to our sweethearts. When we have seen some one in great danger. When some operation is to be performed, as a tooth drawn either for a friend or ourselves, even with or without a local or general anesthetic. A lady sat down in the chair one day and said, "I shall have to have you draw this tooth." I was making an examination of it when she began breathing very heavily. I saw the tooth could be easily saved. I said to her, "What is the matter?" She replied, "O, doctor, I just dread this job." What do you suppose the blood pressure was about this time? It depended on a number of things, of course, but I watched very closely what would take place when I told her I could save the tooth and need not remove it. "What are you going to do with it, doctor?" As soon as I told her what I could do and was not going to remove it, the heavy breathing began to subside and in a few moments she was breathing normally again. The fear of pain caused this condition and the blood pressure was raised to some considerable degree no doubt. The elasticity of the walls of the blood vessels has a marked influence as to pressure.

I want to thank the doctor for this splendid paper. It has been given in a practical manner and is full of good practical suggestions.

DR. ALSIP (closing the discussion) :

There is very little I have to say in closing. From the remarks made by Dr. Reece I think possibly I have been misunderstood. I did not mean to intimate that I do not use suggestion. Analgesia is used only in those cases where I think I can get satisfactory results and when other methods are contra indicated. If a patient has teeth that are not hypersensitive or the sound of the bur does not have a harmful effect on the nervous system I do not use anything except a sharp bur. N_2O and O or the use of any other drug to eliminate pain is used only in the necessary cases.

Dr. Reece said that while N_2O was a safe anesthetic at the

same time it was very hard to administer. That is true of prolonged anesthesia, but is not true of analgesia. Analgesia is easy to secure and to maintain if we do not push the gases. We should take plenty of time to carry the patient to an operable stage. When difficulty arises too much N_2O is usually the fault. We hardly realize how little N_2O it takes to maintain analgesia, so it is better to err on the minus side. More can be added if necessary.

WISCONSIN STATE DENTAL SOCIETY, FORTY-FIFTH
ANNUAL MEETING, HELD AT OCONOMOWOC,
JULY 13, 14, 15, 1915.

DISCUSSION OF THE PRESIDENT'S ADDRESS.

DR. T. A. HARDGROVE, Fond du Lac:

The discussion of a President's address at either a medical or dental society meeting, in this day, is becoming one of honor as well as a privilege to express one's views, at least in a passing way, upon subjects of importance, as the president's address usually contains reference to them, and is an expression of the attitude of the society to matters of such importance as are of vital interest to the profession.

It is an honor to open the discussion for our President, Dr. Wm. Hopkinson, upon his address which is so characteristic of him, bearing down, for instance upon the ethical side of the profession, which is so essential for a substantial progress of the profession. For in a profession or in a professional personality the first thing necessary for progress in a scientific direction is honesty and order, both of which are stimulated and demanded by a good ethical discipline.

One subject of the address, referred to by the President though not expressed in these crude terms, is that any one having knowledge upon any subject should give forth that knowledge. Now, I am not saying that in idleness, as there are some who do not give out all they should.

The President speaks of the responsibility of the profession, which I believe is being met fairly well, though there is not as much reliance being placed upon the microscope as there should be, and too much upon the *x*-ray. I am not belittling the *x*-ray as an aid to diagnose but it should be oftener verified by the microscopical findings.

In the President's reference to dental education, he refers to help that should come from the department of therapeutics, pathology and surgery. Two more branches should be added, histology and diagnosis, both physical and general. I am not so particular whether the dentist takes the M. D. degree but I do want him to study as much of all the branches as the medicine man. I want him to know all that medicine knows and as much more as his dental training will permit, and I believe he can do that in four years. Contrary to the address, I do believe that a higher efficiency may be obtained through a deeper study into medical branches, or to put it just right, the suffering public will be better served considering the problems that are being daily presented for your diagnosis and treatment.

I want to indorse the President's idea for a committee to increase membership. I would like to see our dental journal enlarged and its publication occur more frequent.

I am proud of the President for calling the attention of the meeting to an expression of its loss in the death of Maercklein, who in my mind was one of the few men capable in early days of practicing his profession to the fullness of its possibility. He was first of all a scholar, brilliant, honest and skillful, was possessed of a broad vision, wonderful judgment and an artistic temperament, a pioneer of oral surgery. I am sure you remember when he said the only way to cure pyorrhea alveolaris would be to use an antiseptic strong enough to kill the microbes responsible for it. The regretful thing of all is that he should have been called from his work just when the results of his and other efforts were opening up the scientific side of the profession. So I trust we may realize the loss that not only we have sustained, but the dentistry of the world.

If I were to choose I would have a profile in bronze made and placed in Marquette University or any place that would give

it the prominence his merit deserved and as an incentive for students to strive for higher accomplishments.

DR. H. G. NORTON, Milwaukee:

Mr. President, and members of the Wisconsin State Dental Society: Last evening Dr. Wright informed me that I was supposed to take his place in response to the President's address. I very reluctantly consented, and told him I would do my best but asked him to send over his written address, when he replied "I have none." So I will do my very best on short notice. The President's address, however, has fully covered the benefits of education, ethics and membership and in a most comprehensive manner as could be done by anyone, and there is nothing I could take the liberty to disagree with. However, I wish I had the ability to impress upon the minds of the members present the two or three ideas suggested to me by this paper. The first subject, that of education, is something that I believe the dental profession needs to put more emphasis upon. Not upon education while at college, but upon education after leaving college. The other day I overheard a discussion over the type of text book to be used in one of our public schools and it was finally decided to take the simplest form, the reason being that all students could read it and grasp the different lessons taught therein. However, there was to be supplementary reading for the more advanced minds. The dentist therefore should have supplementary reading which would be an education and something one could enjoy, which is lacking, so woefully lacking at the present time. Only yesterday a prominent physician told me of a remark he had overheard to the effect that it was surprising how little studying and reading the average dentist seems to need. It is an undeniable fact that men outside of our profession realize that we are not apt enough students and do not realize the need of continued studying in our daily practice and that supplementary reading is very necessary to our education and discipline. In this connection I wish to state that I have in my office an arrangement by which we file away all pamphlets and booklets which contain things of interest in the treatment of the teeth. These pamphlets are received by all of us, many of them of no value, and others containing information of great importance. We file them and index them so they can be readily accessible. Like-

wise, with formulas and receipts which I wish to keep so they can be referred to at all times with little effort. These little things are an education in their way and tend to prepare us for a broader and wider field of usefulness. It is a habit to be formed and it soon becomes a pleasure. The next subject, that of ethics, is one that our President could rightfully have dwelt upon more extensively. This subject can be divided into three phases: that of the relation of the dentist to the dentist; the relation of the dentist to his patient; and the relation of the dentist towards himself. I ask myself what is the ethical relation of the dentist towards his patient and towards himself? These two phases happened to come to my mind as I sat here and they were suggested to me in a practical way last week in my office. It is a homely illustration and one I don't like to use at a meeting of this kind, but I feel that the moral responsibility toward our patients should be the most vital thing we have in our work and that moral responsibility should prompt us when a piece of work is presented to us. If we feel that we are not able to skillfully perform a given piece of work the way it should be done, then we should be morally and ethically obliged to look for advice. If we do not know how to proceed to get the best results then look to some one else who can tell us how. My practical illustration is this: A patient has been complaining of a certain tooth. Upon opening it is found an enormous piece of cotton packed in the pulp cavity. Our moral and ethical responsibility should prevent anything like this and if we do not know how to prevent it, seek advice. In the practice of medicine when one physician is not certain as to the effect of his treatment in a certain case he calls in one of his fellow practitioners and a consultation is held, so that we likewise should seek advice from others. The other phase of ethical relation the dentist bears toward himself is of equally great importance. If he has his work at heart, if he has the interest of his patients at heart then he never will allow himself to be fooled into doing anything of this kind, turning out a piece of work that is not a credit to himself and his profession. These are the two phases of the ethical side of our work which seems to me to be of vital importance. Have high ideals and aim for them. The next subject, that of membership, is one that has been of great interest to me for a long time. I am glad that it

was brought up here as it has aroused in me a feeling and desire to impress upon the minds of those present the importance of this subject. There are many reasons to be brought forward why there is not a larger attendance at our meetings. To go back to our organization, I was one of the minority members who did not believe in component societies. However, this need not be discussed at this time. In becoming a member of this society or any other society we overlook the moral responsibility. In becoming a member we pay our dues and let the other fellow do the work. It would be much better to drop out of the society than to feel that it does not need our assistance. It is our duty to co-operate with our neighbor, inducing him to attend and going ourselves. It would have been very easy for me not to be here this afternoon, but I came because I felt it was my duty. I think it would be of value to try the experiment of having the dental society meet in some large hotel where everything would be together, or charter a boat on the lake and hold meetings in that way, where all could discuss the different points and at the same time enjoy the close social relation. If one day is not enough then two or three days or a week could be taken. This is merely a suggestion, but any way that we could obtain a membership or attendance from four to five hundred would be of the greatest help we could possibly have. That brings to mind a little thing which happened on a visit to one of our cities in northern Illinois. I was visiting a friend, a physician, and happened to look over the record of the County Medical Society. This society had an average attendance of six for several consecutive years. Can you conceive anything more deplorable than that with a town of fifty thousand inhabitants and a large population in adjoining counties? The year my friend was elected president the attendance averaged 55. Now there is a reason for that. There must be an incentive to get together and urge attendance. If every person here who has the interest of this society at heart will obligate himself to be more friendly with his neighbor in the town where he lives so that he can invite him to accompany him to the next meeting he will be aiding to the enlarging of the members and attendance, and that is one obligation every member should take upon himself, every year, and bring someone with him and we would then fill a room three

times as large as this. I want to thank the President for the paper and the many ideas and suggestions it gave me, and I wish I could say more to make you all feel the privilege and importance of being here to-day. I think you.

DR. C. L. BABCOCK, Milwaukee:

Mr. Chairman, and members of the Society: I appreciate the opportunity to say a few words on the President's paper, although I had not expected to do so, until today. It would be impossible to cover the whole paper, so I will try to just emphasize one or two points which appeal to me. This question of dental education is one that has been discussed many times and under many conditions. It seems to me that a dental education should comprise everything that the dentist needs. Now, I don't imagine there are many dentists here who have not, at some time in their experience, wished that they knew more of certain things. They have realized that if they had in their equipment certain knowledge, they could do more effective work. Now, the idea, as I take it, of the ideal dental education, is to bring to bear all of the experience of all the dentists up to this time, and concentrate that on the subject of providing for the dentists of the future, all the things which they may need. In my mind that does not necessarily imply that we should all take the M. D. degree although there are many things in the medical curriculum which we could use if we had it. It seems, too, that the dental profession is big enough and broad enough to stand alone—that it does not need to be an attachment of the medical profession. Although we may be related to it closely, we can go along hand in hand, as it were, and yet be independent. And it seems to me, from experience, that, as dentists in our organized capacity, and as individuals, we should put our thoughts together to work out this question. The dental schools will fill our demands,—they will have to. They may do it unwillingly for a time, but they will come to us. They will give to us the curriculum we demand, and should be one to cover the education we need, as determined by experience.

Then, this question of ethics follows right along after the question of education. Ethics, in a fundamental way, is doing as you would like to be done by, of using your powers, your education, your experience in a way that is right, the way, that

really at the bottom, will be most conducive to human happiness. A true expression of our relations to our fellow human beings is, perhaps, expressed in the idea of "Service for service." We are not here to get something for nothing. A professional man has no right to accept something, either from the general public or from his associates, without giving adequate service in return. And the code of ethics might be built up around that every idea. Another thing involved in this question of professional ethics is that of a true, professional ideal. One of the best expressions which I have ever heard, and I don't know the author of it, but this thing has remained in my memory for many years, "To learn for all, to practice for all, to teach for all." It is, unfortunately, true not alone in professional life, but in all conditions of human life—that there are some who cannot resist the temptation to attempt to profit by others' misfortunes, or by others' weaknesses. That is the piratical idea and it is, unfortunately, true that the pirates are not all dead. I was greatly impressed when reading one time, with the expression of old Pierre Fauchard, about two hundred years ago, when preparing to write what I would say was, perhaps, the first real work on Dentistry. He said he did it with great hesitation, for two reasons: The first being that there were others better fitted to do it, and the second was that he feared he was laying himself open to attack on the part of his competitors, and there was no doubt that many of them were ready to attack him as he was one of the successful men of his day, and professional jealousy was bitter, and that he probably would suffer financial loss because he was to give his competitors certain processes and formulae which he possessed, and which he considered very valuable. I have never seen any record of any expression on the part of Dr. Fauchard of how he felt about it later, after his work was completed and published, but we know that he lived long and prospered, and must have shared in the benefits which his great effort conferred upon his profession, and mankind. I believe it will work out that way in every case.

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EDITORIAL.

ACUTE ULCEROUS GINGIVITIS.

This disease first described by Dr. Thomas L. Gilmer in the DENTAL REVIEW of May, 1906, seems to be somewhat on the increase. At the time Dr. Gilmer wrote he made the statement that it was "seen but rarely," and in a relative sense this may still hold true, but it would seem in recent years to be more common than formerly. Up to the time of Dr. Gilmer's article the present writer recalls having seen only two, or possibly three, cases—the third having been so mild as not to be wholly typical—but within the past year at least four cases have come under his notice.

To quote briefly from Dr. Gilmer's article: "The onset of the disease is sudden, the earliest symptoms indicated by a slight malaise which is quickly followed by rapid ulceration, at first confined to the gingivae, usually about two or three of the anterior teeth on both jaws simultaneously and in corresponding localities; later it is extended to the gums about a number of the teeth, or groups of teeth, but rarely if ever does it include the entire gum margin."

In some cases the ulceration is quite severe, and the gums are excessively sensitive. For treatment Dr. Gilmer recommends antiseptic mouth washes such as warm boric acid solution, a cleansing of the surfaces with 3 per cent pyrozone followed by the application of compound tincture benzoin. As a constitutional treatment he suggests four tablets of mercurous chlorid, 4/20 grain each, morning, noon and night, followed by a saline cathartic on rising.

The writer has found as a local application, following the thorough cleansing of the parts with an antiseptic spray driven by compressed air, the crystals of argyrol to be very effective. To place a small crystal less than the size of the head of an ordinary pin in each interproximal space is to see the crystals melt down and flow into every interstice about the teeth. This seems to aid materially in clearing up the affection, and hastening recovery.

It is hoped that the profession will be on the alert for this disease, and that ultimately we shall be better informed as to its etiology and thus better equipped to cope with it.

MEMORIAL EXERCISES FOR THE LATE DR. G. V. BLACK

Under the auspices of the Chicago Dental Society memorial exercises will be held for Dr. G. V. Black on the second Tuesday in December, 1915, at the Hotel La Salle, at 8 P. M. The profession in this vicinity should make a note of this date, and arrange to be present.

BOOK REVIEWS.

ORAL SURGERY: A Treatise on the Diseases, Injuries and Malformations of the Mouth and Associated Parts. By *Truman W. Brophy, M. D., D. D. S., LL. D., Sc. D., F. A. C. S.*, President and Professor of Oral Surgery, Chicago College of Dental Surgery; President International Dental Federation; Member American Medical Association, Illinois Medical Society, Chicago Medical and Dental Societies, Illinois State Dental Society, National Dental Association, Honorary Member of all National Dental Associations of Continental Europe, North America and several other Countries; Medallist Odontological Societies of Paris and Italy, and of New York State Dental Society; Order of Officer of Public Instruction by the French Republic; Oral Surgeon to St. Joseph's, Michael Reese and other Chicago Hospitals; Consulting Oral Surgeon Presbyterian Hospital, etc. With special chapters by Matthew Cryer, M. D., G. Hudson Makuen, M. D., William J. Younger, M. D., F. W. Belknap, M. D., Calvin S. Case, M. D., D. D. S.,

With 909 illustrations, including 39 plates in colors. 1,090 pages. Price \$10.00. Published by P. Blakiston's Son & Co., Philadelphia.

It is seldom that a book reaches the reviewer's desk with such a commanding array of recommendations as this. It has long been generally known to the profession that Dr. Brophy was at work upon this volume, in fact he has devoted the best energies of recent years to its production. The result is a book which will at once take a conspicuous place in the literature of dentistry and medicine. It is manifestly impossible in the limits of a magazine review to particularize in all of the subjects presented in a book of more than a thousand pages, but two things seem to stand out with unusual interest. One is the emphasis which the author places on the possibility of performing many of the surgical operations on the jaws within the mouth, thus avoiding the unsightly scars which have so frequently marred an otherwise good result. Dr. Brophy has insistently called attention to this in his papers and discussions before societies for years, and it is made a conspicuous feature in his book. Illustrations are shown of the method of removing the infra-orbital nerve intra-orally, and the operation is made so clear and simple that any surgeon of ordinary ability can perform it.

The other thing to which particular attention should be called is the author's work on hare-lip and cleft palate. No man in the world has performed so many of these operations as has Dr. Brophy, and no one has been so uniformly successful. Having devoted a life study to this condition, it is quite natural that the author should make a conspicuous showing of it in his book. As an indication of this he devotes more than 230 pages of text and 350 illustrations to this one subject, and it may be said to constitute a complete classic on the treatment of these affections. The author's contention for an early operation in cleft palate cases is amply justified by an examination of the cases presented; and the argument used seems unanswerable. The Brophy operation for closure of the cleft in infants has become widely known in surgical annals, and while some operators have not made a success of it the indications go to prove that the reason is that they do not know how to perform it. It is hoped that a close study of this book will enable any surgeon to successfully make this operation and thus bring its benefits more generally to the people. Dr. Brophy has assuredly demonstrated

its efficacy in many hundreds of cases, and now that its technique is so clearly brought out in the present volume there is no longer any need for depriving cleft palate patients of its benefits.

The volume as a whole is a noteworthy contribution to the science and art of oral surgery. It is the most comprehensive work of its kind that has ever been published, and it should be in the hands of every surgeon whether special or general.

Dr. Brophy's great service to the world as its foremost exponent of the best there is in his particular field is now rounded out by placing on permanent record the results of his ripe experience, and the professions of medicine and dentistry are enriched thereby. Congratulations are due not only to the author of the book but to the publishers as well. They have brought out a volume which is a credit to all concerned.

PRACTICAL HINTS DEPARTMENT.

This department is for readers who are busy. Articles, to be available, must be brief—not more than 200 words in length. Any practical idea is welcomed, and due credit will be given for each article published. Every practitioner has many little wrinkles that help him out in daily practice, and if they help him they will help others. Thus they should be published. Send in your practical hints to THE DENTAL REVIEW, 810 Masonic Temple, Chicago, Ill.

Burns from Acids:—If you get carbolic acid on any surface where it is not wanted, apply absolute alcohol at once. If hydrofluoric acid, apply a strong solution of bicarbonate of soda. Never use these acids without having readily at hand some agent to stop their action immediately in case of accident.—*D. C.*

Worn Pulleys:—If a pulley on the engine gets worn so that the groove is rounded instead of V-shaped, and the belt begins to slip just when you need the engine most, place an elastic rubber band around the pulley and let the belt play on that. This will effectually prevent slipping, and, while only a temporary expedient, it helps out in an emergency. To avoid trouble in the future, get a new pulley.—*O. P.*

To Obtund Dentin:—It is good practice to sterilize cavity with alcohol before desensitizing with Iodrenalaine, for both

excavating and immediate pulp removal. With this method of procedure in a large number of cases, perfect anesthesia can be obtained almost instantaneously and remains long enough to give ample time for completing the operation in hand. Results are most gratifying to both patient and operator. Teeth that were hyper-sensitive and tender to stress of mastication previous to operation, become comfortable and useful members.—*Elmer E. Lampert, Chicago.*

To Compensate for Shrinkage in a Large Gold Inlay:—Where a cast gold inlay is to be made for a cavity involving the mesial, occlusal and distal surfaces of a bicuspid or molar if there is any shrinkage the inlay will invariably show a defective line at the gingival margins. To overcome this, the gingival margins of the cavity should be quite freely beveled so that the inlay will cover them with a lap joint instead of a butt joint. Even if there is a slight shrinkage the thin lap of gold can be burnished down to the cavity margin so that when cemented the inlay will perfectly seal the cavity.—*I. D.*

To Prevent Thumb-Sucking in Children:—Dr. Geo. H. Henderson calls attention to a very ingenious method of preventing thumbsucking suggested to him by Dr. Truman W. Brophy. Make a pasteboard cuff of the right size and length to slip on the arm, small enough not to slip off the hand. Sew cotton or other material on the edge to prevent it from irritating the hand. It can be bound with adhesive tape or straps and buckles. This will prevent any use of the elbow, and it is much more humane than the use of bitter drugs and other such expedients.

To Properly Seat Gold Inlays in the Occlusal Surfaces of Molars or Bicuspids:—It frequently happens that in cementing a gold inlay to place the operator is not certain of having it go down properly in position. It may bind slightly along one of the walls, and thus leave a margin of the inlay standing above the cavity. This is not detected at the moment on account of the cement, and thus an unsightly and uncertain margin is left. To obviate this and ensure a perfect seating of the inlay it is recommended to place a piece of unvulcanized rubber over the inlay while the cement is still plastic, and have the patient close down

quite forcibly with the opposing tooth impinging on the rubber. This will exert pressure on the inlay throughout its entire area and seat it along all its margins.—*J. B.*

Restoring Fractured Root with Synthetic Porcelain for Shell Crown:—To save a tooth that is split under the gum does not look very encouraging at first, either to the dentist or patient. However, when a patient is desirous of saving the tooth it is up to the dentist to plan a way to restore it. This means extra work but there are the patients who are willing to pay for it if you can assure them that the tooth is still good for a crown. What is needed is a method to replace the broken part with a satisfactory material and feel sure of results. Extract the broken piece and remove the membrane, making a polished surface. Usually a fractured tooth is one with pulp removed and roots filled; if not,



Fig. 1.



Fig. 2.

treat and fill. Shape the pulp chamber as for an inlay or tapering box with flat bottom, as in Fig. 1. Fill any undercut with cement, so it will draw. Dry and touch a little sandarac varnish in cavity, line with thin tin foil and oil to keep cement from sticking. Hold fracture in place and fill box with soft quick-setting cement like Ames' copper cement. When set, remove, and cement should come away with the fragment. Hold gum back with gutta-percha or cotton and sandarac, and dismiss patient. Mount fragment on piece of sticky wax for convenience of handling. Slightly oil fragment and cement, soften piece of modeling compound with dry heat, start with a small end of the compound and press around cement and then work the rest over

the fracture, leaving it so it will draw. When cooled, carefully withdraw from the compound. Clean oil from impression in compound and fill it with Synthetic porcelain, pressing it in firmly. Lay aside until properly set. It is well to make several to be sure of one with good edges. Remove modeling compound from the reproduction with dry heat. After trimming surplus away and shaping for crown, polish part to go under the gum. When satisfied with fit of reproduction prepare rest of tooth for shell crown so there is no grinding needed after cementing the reproduction in place the same as setting an inlay. By this method the inlay in the pulp chamber guides the part under the gum so it must fit right up to the tooth the same as the broken part did, with only a small amount of cement in the joint. Prepared as in Fig. 2 and with good fitting crown the gum will heal very kindly.—*H. Reid Staley, Oquawka, Ill.*

MEMORANDA.

DR. WALLACE J. COVEY.

Dr. Wallace J. Covey, dentist, died October 7 at his residence, 4539 Sheridan road. Burial from St. Simon's Episcopal church at Leland and Racine avenues, October 9, at 2 o'clock.

IOWA STATE BOARD OF DENTAL EXAMINERS.

The next meeting of the Iowa State Board of Dental Examiners will be held at Iowa City, Iowa, commencing Monday morning at 9 o'clock, December 6. For full information and application blanks, apply to Dr. J. A. West, secretary, 417 Utica building, Des Moines, Iowa.

INDIANA STATE BOARD OF DENTAL EXAMINERS.

The next meeting of the Indiana State Board of Dental Examiners will be held at the State House, Indianapolis, commencing November 8, and continuing five or six days. For application blanks and full particulars, address Dr. Fred J. Prow, secretary, Bloomington, Ind.

ILLINOIS STATE BOARD OF DENTAL EXAMINERS.

The next examination held by the Illinois State Board of Dental Examiners will commence November 8, at 9 a. m. at the Illinois College of Dental Surgery, Chicago, Ill. Application blanks and further information can be secured from the secretary. O. H. SEIFERT, Secretary, Springfield, Ill.

DR. SAMUEL A. BEECHER.

Dr. Samuel A. Beecher died in St. Paul, Minn., September 18, 1915. Dr. Beecher was born in Washington, Mo., in the year 1843. He was a graduate of Pennsylvania. In 1867 he located in St. Paul, Minn., where he practiced his profession until his retirement, six years ago.

MAX E. ERNST.

MARQUETTE UNIVERSITY DENTAL ALUMNI ASSOCIATION.

The tenth annual clinic, manufacturers' and dealers' exhibit of the Marquette University Dental Alumni Association, will be held at the Milwaukee Auditorium February 16, 17 and 18, 1916. The officers and committees are planning a program for this meeting which they feel sure will be of interest to every dental practitioner. Try and arrange to be with us at this meeting.—V. A. Smith, Secretary.

TEXAS STATE BOARD OF DENTAL EXAMINERS.

Next regular meeting of the Texas State Board of Dental Examiners will be held in Dallas, Texas, at the Adolphus Hotel, beginning at 9 o'clock a. m., December 13, 1915. All applications should be in the hands of the secretary not later than December 8. The fee of \$25 must accompany all applications. Official application blanks sent upon request. For further information, address C. M. McCauley, secretary, 840 Wilson building, Dallas, Texas.

THE FLORIDA STATE DENTAL SOCIETY.

The last meeting of the Florida State Dental Society was held at Pass-A-Grille, Fla., on June 9, 10, 11, 1915, at which time the following officers were elected for the ensuing year: Dr. A. M. Jackson, Lakeland, president; Dr. J. L. Williams, Jacksonville, first vice-president; Dr. C. J. Caraballo, Tampa, second vice-president; Dr. D. D. Crews, Fort Myers, recording secretary; Dr. M. C. Izlar, Ocala, corresponding secretary; Dr. F. S. Robinson, Jacksonville, treasurer. Executive committee: Dr. C. L. Nance, Tampa, chairman; Dr. W. K. Bradfield, St. Petersburg; Dr. J. R. Lynn, Fernandina; Dr. G. A. Brummett, Fort Myers; Dr. H. L. Chilson, Bradentown. It was decided to hold the next meeting at Orlando, Fla., beginning on the third Wednesday in June, 1916. The meeting at Pass-A-Grille was a very enjoyable and interesting one.

M. C. IZLAR, Corresponding Secretary.

RESOLUTIONS ON THE DEATH OF DR. BLACK.

The members of the Minnesota State Dental Association wish publicly to express their sorrow in the the death of their friend and associate, Greene Vardiman Black, and to that end resolve:

That the loss of a teacher so zealous in the cause of science, so warmly human in his devotion to the best interests of his students and his fellows, so distinguished in his far-reaching influence upon the standards and ideals of scientific education, is irreparable to the profession of dentistry.

That the warmest sympathy be extended to his family in their great bereavement.

That a copy of these resolutions be spread upon the minutes of the Minnesota State Dental Association, a copy sent to the family of the deceased and to the various dental journals.

GLEN F. ANDREWS, Chairman; ROBERT WILSON, ALFRED OWRE.

PANAMA-PACIFIC DENTAL CONGRESS.

The Panama-Pacific Dental Congress has passed into history, and in accordance with the opinion very generally expressed by those in attendance, the meeting was a decided success.

The Pacific Dental Congress Commission of 1915, the corporation now in charge of all matters relating to the congress, and the publications of the transactions, desires to announce that a copy of the complete transactions, when published, and a copy of the official souvenir program, will be sent to

anyone making application therefor to the secretary of the commission, Dr. Arthur M. Flood, 240 Stockton street, San Francisco, Cal., and forwarding the fee of \$10.

Those subscribing for these extra copies of the transactions cannot be regarded as being members of the congress, not having applied for membership before the meeting, or being in attendance at the same, but we believe these transactions will be a very valuable addition to the history of dentistry, and the souvenir program, containing as it does many items of historical interest and value, will be acceptable to any member of the profession.

PACIFIC DENTAL CONGRESS COMMISSION OF 1915.

Arthur M. Flood, D. D. S., Secretary.

THE OHIO STATE DENTAL SOCIETY SEMI-CENTENNIAL MEETING AND DEDICATION OF THE MILLER MEMORIAL AT COLUMBUS, DECEMBER 7, 8, 9 AND 10, 1915.

The program of papers, so far as completed, includes: Historical address by the president, Dr. E. C. Mills; Dr. Herman Prinz, "On Causes Concerning Susceptibility and Immunity to Dental Caries"; Mr. George H. Wilson, "Some Problems in Mounting Full Artificial Dentures"; Dr. Charles C. Voelker, "The Place of Silicate Cements in Dentistry"; Dr. George E. Johnson, "How to Read X-Ray Films"; Dr. J. H. J. Upham, "Pyorrhea Alveolaris from a Medical Viewpoint." Fifteen-minute papers on practical subjects by: Dr. W. O. Hulick, "Are Crowns and Bridges a Menace to Health"; Dr. J. P. Henahan, "Conductive Anesthesia in the General Practice of Dentistry"; Dr. C. J. Teter, "Management of Difficult Extractions"; Dr. H. V. Cottrell, "Accessories to Articulation"; Dr. Gillette Hayden, "Differentiation between Average Tooth Cleaning and Prophylaxis"; Dr. L. E. Custer, subject to be announced. Explanation of the Harrison narcotic law by the deputy collector of internal revenue. Dr. Edward C. Kirk will deliver the principal address at the dedication of the Miller memorial statue on Wednesday afternoon, followed by Drs. T. P. Hinman, T. W. Brophy, N. S. Hoff and others. Thursday morning will be devoted to the presentation of a number of illustrated, descriptive clinics before the entire society, and Friday morning to a large number of general chair and table clinics. On Wednesday evening a banquet will be served for our guests and members. It is the expectation that this meeting will set a new high mark in state society gatherings. Dr. Hinman, president, and Dr. King, general secretary, of the National Dental Association, will be present, and members of all other state societies will be given a cordial welcome. In view of the features of especial interest, we hope to have representatives from every state, inasmuch as nearly every state contributed to the expense of the Miller memorial. Please note the four days' session and be assured of a hearty welcome and a good time.—F. R. Chapman, Secretary, 305 Schultz building, Columbus, Ohio.

MEMORIAL RESOLUTION ADOPTED BY THE FACULTY OF THE NORTHWESTERN UNIVERSITY DENTAL SCHOOL ON THURSDAY EVENING, SEPTEMBER 23, 1915,
AT A SPECIAL MEETING CONVENED TO COMMEMORATE THE LIFE
AND SERVICES OF DEAN GREENE VARDIMAN BLACK.

The following resolution was prepared and presented by Doctors Noyes and Gilmer and was unanimously adopted by a rising vote:

The faculty and teaching staff of Northwestern University Dental School enter upon their records this memorial of their beloved dean, Greene Vardiman Black, M. D., D. D. S., Sc. D., LL. D., who died August 31, 1915, at the age of seventy-nine years.

Dr. Black was a teacher in dental schools for forty-five years, with an interruption of only three years, during which time he was the first president of the Illinois State Board of Dental Examiners, in which office he continued for four years more after he resumed teaching (1881 to 1887).

His first school work was as lecturer on pathology, histology and operative dentistry in the Missouri Dental College, 1870-1880. He was professor of dental pathology in the Chicago College of Dental Surgery, 1883-1889. During this time, in 1887, he introduced the teaching of dental technics, by which the teaching of technical procedures in both operative and prosthetic dentistry are taught in laboratories, instead of depending, as previously, upon practical work in the clinic to acquire knowledge and skill in technical operations. This was an entirely new departure in dental teaching which was very soon adopted by most of the schools throughout the country, and finally by all of them. He was professor of dental pathology and bacteriology in the dental department of the University of Iowa, 1890-1891. In the latter year (1891) he entered the faculty of this school as professor of dental pathology and bacteriology till 1897, when he became dean and professor of operative dentistry, dental pathology and bacteriology, and continued until his death.

The most important of Dr. Black's books are the chapters he wrote for the "American System of Dentistry," "The Periosteum and Peridental Membrane," the "Dental Anatomy," the "Operative Dentistry" and the "Special Dental Pathology."

His nature was simple, sincere and approachable, and everyone who showed an interest in dental matters received a cordial welcome and always found him ready to impart knowledge. He was a friendly man and attracted everyone who came within the sphere of his influence. The greatest desire and ambition of his life was to improve the standards and methods of dental education.

While in practice he was a very exceptionally wise and skillful operator, and throughout his long life he was a hard student, a successful investigator and inventor and probably the most useful and the most influential man in the dental profession.

It would be interesting to tell of Dr. Black's studies and investigations that did not relate to dentistry. Two may be mentioned. He at one time made a study of the rings of annual growth in tree stumps, to find out which were the wet and which the dry seasons, recorded in the varying thickness of the annual growth, and he found that his interpretations corresponded accurately with the recorded weather reports as far back as there were any such reports. At another time he worked out the life history of thirty or forty varieties of households. He was a many-sided man, and could do an astonishing number of different things, and do them better than other men could do them.

The honor, admiration and affection we all felt for him can be only feebly expressed.

We also desire to express to Mrs. Black, the devoted wife, our most sincere and deep-felt sympathy in her bereavement. While making full recognition of the services of her distinguished husband, we wish to express our belief that she was no small factor in his great achievements, and we desire to acknowledge at this time the sacrifices she made in aid of the success of his labors.

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No. 12

THE PRESENT STATUS OF OUR KNOWLEDGE OF PYORRHEA ALVEOLARIS, AND ITS CURE.*

BY RICHARD H. RIETHMÜLLER, PH. D. (UNIV. OF PENNA.), D. D. S.,
PHILADELPHIA, PA.

Next to dental caries, the disease or rather, the complex of diseases usually designated with the term pyorrhea alveolaris is the most generally prevalent and dangerous of dental disorders, at the same time is the most obscure.

EARLY LITERATURE

The first description of pyorrhea alveolaris, besides that contained in the Ebers papyrus, I find in the *Zene Arznei Büchlein* of 1530, which bases upon a much earlier Arabic source, and it is remarkable how little our knowledge has since then progressed in the essential features of pyorrhea. "Dentium commotio is the loosening of the teeth and their tendency to fall out prematurely, which is due either to the yielding, weakness or disease of the gingivae or to the anemia of the alveoli which hold the teeth in place. It occurs if a cold from the head falls upon the gingivae or the roots of the teeth and laxates them in a destructive manner. Or it is due to diseases of the stomach when bad humors arise therefrom and injure the gingivae. For this, according to Mesue, chiefly three drugs are used. (Follow suggestions for purging and astringents, locally by vinegar with the addition of various medicinal herbs, and bismuth, drying and cleansing the teeth of adhering matter, mastic, and washing and rinsing the mouth with a decoction of roses and pomgranate flowers.) If the looseness is due to a blow, fall, etc., the loose teeth are to be ligated to the firm and uninjured ones with a silk or gold

*Read before the New Hampshire State Dental Society, at its annual meeting, Weirs, N. H., June 22, 1915.

thread, and light and soft food is to be used, together with medicine which will stop and contract. . . . Or the teeth are rubbed with calcined buckhorn. (Follow numerous formulae for mastics and astringents.) Some cauterize the gingivae on either side with a glowing iron, then smear honey over the cauterized parts and rinse the mouth with meet, and when it suppurates use desiccating and anodine medicine; but much cauterizing is dangerous and requires a most skilful master."

It is evident from the foregoing how little we have progressed in essentials. Fauchard in 1746, Hunter in 1780, and Riggs in 1867, have given perhaps fuller descriptions, but they had little clearer ideas on the subject.

DEFECTIVE NOMENCLATURE

One of the first difficulties which confront the student of this disease is the lack of accuracy in our dental nomenclature. No other branch of science would tolerate such a diversity of terminology, as dentistry unfortunately is still willing to acquiesce in, and it would add much to the progress and systematization of dental research if a uniform standard nomenclature were at last universally adopted. Just a few of the terms: Riggs' disease, pyorrhea alveolaris, interstitial gingivitis, chronic alveolar periostitis, alveolar caries, chronic marginal purulent periodontitis, arthrodental gingivitis, phagedenic pericementitis, atrophic alveolitis, etc.

PATHOLOGICAL ANATOMY

The anatomic picture of pyorrhea is simple, and has been most ably described by Talbot and Noyes. The essential feature is traumatism of some sort of the circular ligament, resulting in a progressive chronic periodontitis combined with destruction of the osseous alveolus. The soft tissue is altered into granulating tissue with more or less pus formation. Systemically a certain predisposition seems to be necessary for the development of the disease, locally the loosening of the normal attachment of the gum to the tooth.

THE VIEWS REGARDING ETIOLOGY

This brings us immediately to the etiology regarding which Port and Euler have collected no less than 350 different views. These views can be divided into three groups: 1. The Localists, 2. The Constitutionlists, and 3. The Conformists. Among the localists

we have three main divisions, namely, those who regard tartar as the essential etiological factor, those who emphasize local infection, and those who consider malocclusion as *the* causative agent. The important rôle of tartar, which forms an ideal medium for enormous masses of bacteria, is generally recognized, though not every accumulation of tartar leads to pyorrhea. On the other hand, pyorrhea exists in teeth where hardly any traces of serumal calculus can be detected. Bacteria, also, are commonly regarded as important etiological factors, but which bacteria are the specific ones we are still far from knowing. At the outset, we may state that the much-hailed endamoeba buccalis will most probably not bring a final solution of the problem, as we shall see later. The best attitude to assume toward bacteria is probably this: They are not so much the original causative agents, as they maintain and further the disease. At all events, we almost always find a mixed infection present, which in many cases has been favorably influenced by vaccine therapy with stock, or better, with autogenous bacterins.

Malocclusion, trismus, nervous grinding of the teeth, trauma, etc., surely constitute an etiological factor owing to the continued anemia in the peridental tissues produced. It is interesting to note that in animals too, pyorrheal conditions are found; their teeth exhibit greater deposits of tartar than are usually found in man, owing to the absence of artificial cleansing as adopted by human beings.

The adherents of the constitutional theory of pyorrhea ascribe this disease to general constitutional disturbances directly or by way of predisposition. Of *nutritional disturbances*, Rhein mentions toxins, diabetes, chronic rheumatism, Bright's disease, scurvy, chlorosis, anemia, leukemia, pregnancy; of *acute infections*, typhus, tuberculosis, malaria, acute rheumatism, pneumonia, pericarditis, syphilis; of *nervous disorders*, inflammation of the brain, the spinal cord, neurasthenia, hysteria; of *toxic and medicinal agents*, mercury, lead, iodine. Usually rickets, diabetes, nephritis, gout and tabes dorsalis are considered to be predisposing to pyorrhea. In diabetics, alveolar pyorrhea has been noted to be present in 90 per cent. of cases. It is probably safe to assume that these diseases do not directly produce the disorder, but that owing to reduced resistance and low opsonic index which they establish, the local stimuli are rendered more powerful and dangerous.

SYMPTOMS

As the cardinal symptoms of pyorrhea we may briefly cite the following: Redness, swelling and loosening of the gingivae, pus, concretions, granulations, movability of the teeth in their alveoli, dull sound on percussion, pain, gradual advance of the disease, tendency to recurrence.

The symptomatology has perhaps been most fully described by Dr. H. J. Mamlock, of Berlin, in a paper offered before the Seventh International Dental Congress of London, 1914, as follows:

CLINICAL SYMPTOMS OF PYORRHEA ALVEOLARIS

A.—Subjective Symptoms: 1, loosening of teeth; 2, slight hemorrhage from gingivae; 3, foul odor and viscous deposits; 4, fetid breath; 5, secretion from gingival pockets; 6, hypersensitivity of dentin, especially at cervical margin, pulpitis, neuralgia; 7, general discomfort, viz., reduced power of mastication, loss of appetite, awaking at night due to flow of pus and desire to rinse the mouth, anemia, progressive nervousness; 8, shrinking, or in some cases hypertrophy of gingivae.

B.—Objective Symptoms: I.—Those observed upon examination of the mouth: 1, looseness of teeth; 2, shrinking, or in some cases hypertrophy of gingivae; 3, secretions; 4, hemorrhage upon slight touch of gingivae; 5, formation of pockets and granulations; 6, deposition of tartar; 7, fetid breath; 8, formation of fistulae; 9, abscesses; 10, uneven distribution of masticatory stress; 11, discoloration of gingivae and mucosa; 12, dislocation of individual teeth; 13, deviation of teeth, elongation; 14, dull sound on percussion; 15, distortion of gingival festoons; 16, affections of the lymphatic glands; 17, pulp reactions.

II.—Those determined by the radiograph as indicated by Dieck: 1, serumal tartar; 2, osseous changes; 3, degree of looseness; 4, granulations; 5, resorption.

III.—Those determined by the microscope: 1, bacteriologic, as indicated by Shmamine; 2, histo-pathologic, as indicated by Roemer.

IV.—Serologic tests, as indicated by Proskauer.

MODE OF TRANSMISSION

As for the possibility of inoculating the disease, Hecker claims to have transmitted pyorrhea to guinea pigs. Various observers have reported the occurrence of the disease in the same family through

several generations, and Miller cites a case of its transmission by an infected instrument. From personal observation, I have noted the transmission of infection from a woman's pyorrheal mouth to infants' eyes, simulating ophthalmia neonatorum, without the presence of Neisser's bacillus or gonococcus. From what has been said above, the transmission of the disease in cases of predisposition seems more than likely. As to age, the majority of cases are observed after puberty. Of individual teeth, the incisors are most generally involved; the proportion in molars and premolars is about equal, while the cuspids seem to be the least affected.

HISTOPATHOLOGY

In regard to histopathology, one of the mysterious phenomena is that devitalized teeth are practically never affected, which fact seems to justify the therapeutic measure of wholesale devitalization of teeth in refractory cases. This observation is corroborated by the analogous observation that in devitalized deciduous teeth resorption is greatly retarded, though, to be honest, we can only surmise the actual causes for this strange phenomenon.

DIFFERENTIAL DIAGNOSIS

For differential diagnosis, we have to consider loosening of teeth owing to faulty articulation, traumatism, senile atrophy of the alveolar process, and precocious alveolar atrophy. Pus exuding from the gingivae or alveoli may be due, 1, to simple gingivitis; 2, to salivary tartar; 3, to serumal tartar, as it appears as a secondary sequel of periodontitis; 4, to a combination of 1 and 3, or of 2 and 3; 5, there are undoubtedly cases of pyorrhea in which there is no calculus present; 6, to syphilitic or tuberculous affections, typhus, or metallic intoxications; 7, to scurvy in its disappearing stages.

PROGNOSIS

In regard to prognosis, a more favorable attitude has been generally assumed by practitioners, since prophylaxis in its capital importance has been more fully recognized. An early diagnosis is of prime value. Even the prospect of loss of all the affected teeth has lost some of its terrors, since modern prosthesis is able to supply efficient artificial substitutes, and in very advanced cases, the resorting to prosthesis seems to be the better part of valor, and the better service to the patient's general health. In all cases, however, in which the disease is correctly diagnosed in its early stages, and its etiology

is plainly recognized, a favorable prognosis can be given. In cases where the etiology remains obscure, the disease can usually be arrested by a serial application of the many therapeutic agents available, and in refractory cases the spontaneous loss of the teeth can be prevented by splints.

THErapy

As for therapy, the constitutional factor must never be lost sight of, and consultation with the family physician for urinary, salivary and blood analysis may save the dentist much discouragement. The thorough removal of all calculus and subsequent polishing of the scaled root surfaces undoubtedly is the *sine qua non* of successful treatment, the instrumentarium and technique depending upon the operator's personal experience and skill. Of chemical means, acids which have a decalcifying action upon the tartar are first to be considered, and formic, sulfuric, aromatic sulfuric, trichloroacetic, nitric, hydrochloric and lactic acids have been more or less successfully employed. Ammonium fluorid and about a dozen proprietary preparations thereof have from time to time attracted special attention.

For combating the micro-organisms, vaccines, pyocyanase, Deutschmann horse serum, all of which have to be employed with extreme caution, have been advocated. The elimination of granulating tissue is most successfully attained by surgical means, such as curatage and the actual cautery. Of medicaments for the destruction of inflammatory tissue, iodine, chlorphenol, silver nitrate, zinc chlorid, chrome-alum, tannic acid and innumerable others have been suggested; all of them are intended to alter the unhealthy flabby granulating tissue into sound firm tissue. For the purpose of disinfection, sublimate of mercury, hydrogen dioxid, iodoform, thymol, etc., can do no harm. Radium treatment, despite the sanguine expectations originally attached to it, has been a sad disappointment. Hand and vibration massage and the high frequency current are valuable adjuvants, especially in patients who can afford the time and the price. Uniform distribution of the masticatory stress, relief of the diseased teeth, and splints of various sorts all have their places. Beck's bismuth paste has been a bitter disappointment to me, although initially it seemed to bring about some improvement. It is, however, a dangerous drug to employ freely and indiscriminately.

Deep muscular injections of succinimid of mercury, as suggested

by Dr. B. L. Wright, and practiced by him in co-operation with Dr. P. G. White, at the Portsmouth Naval Hospital, and since the appearance of their noteworthy publications, by other investigators, have produced remarkable results, especially in cases of long standing and serious systemic involvement. The theory and practice of these two coworkers is so thoroughly sound, their brilliant results are so far above any shadow of delusion, and the co-operation between these medical and dental practitioners, like that of A. J. Smith and M. T. Barrett in the same field of endeavor, is so earnest as to deserve general emulation. The administration of succinimid of mercury is so simple, though apparently somewhat outside the dentist's domain, and its effects when combined with proper instrumentation are so beneficent as to inspire sanguine hopes for the final conquest of this refractory disorder. Moreover, when it is remembered that mercury in many forms has for centuries proved to be a most efficient foe of animal and vegetable parasites, the success of this form of medication in pyorrhea is not to be wondered at.

SYSTEMIC DISEASES DUE TO PYORRHEA

The necessity for curing pyorrhea may be emphasized by enumerating a few systemic diseases which may have their origin from this disorder. Cancer of the squamous-celled carcinoma type, diffuse cellulitis, orbital periostitis and cellulitis, optic neuritis and ocular muscular paresis, acute and chronic lymphadenitis, septic bronchitis and pneumonia, gastritis, chronic toxemia, rheumatism, anemia of the septic or progressive pernicious types, arthritis, malignant endocarditis and septicemia, together with a large number of diseases such as tuberculosis, which are unfavorably influenced by it.

THE ENDAMÆBA BUCCALIS

It now remains to look critically into the studies of Smith and Barrett concerning pyorrhea which, like almost everything new in dentistry, have been hailed with considerable ado, and have been attended with great expectations and some disappointments through none of these researchers' fault. Quite a flurry was created in dental circles by the publication of a paper on "The Protozoa of the Mouth in Relation to Pyorrhea Alveolaris," by Dr. M. T. Barrett and Dr. Allen J. Smith, in the August, 1914, issue of *Dental Cosmos*, and the partial corroboration of their findings by Dr. Chiavaro, of Rome, and by many other investigators since, notable among whom are Drs. Bass

and Johns, of New Orleans, who have rushed their far from conclusive and, as far as dental science goes, debatable studies into print in book form. Several forms of endamoebae, as found in the mouth, had been described before, so the *Endamoeba Kartulisi*, probably a pathogenic protozoon giving rise to suppurative tumors of the jaws; *Endamoeba Buccalis* of Prowazek (1904) and of Steinberg (1862), the *Endamoeba gingivalis* of Gross (1849), the *Endamoeba dentalis* of Grassi (1879) and the amoeba found by Flexner of Baltimore in 1892 in mandibular abscesses. This protozoon can be demonstrated under the microscope either alive by a smear in physiologic salt solution, or fixed with Giemsa's stain (azure II eosin dissolved in glycerin with addition of methylic alcohol), Ehrlich's hematoxylin or Heidenhain's ferric hematoxylin. Briefly stated, in Barrett's words, the procedure of examination is as follows: "A small portion of the purulent contents of one of the pockets is taken up on a suitable instrument such as a flat stiff scaler not more than from one-tenth to one-eighth of an inch in width, and this is diffused in a drop of slightly warmed normal saline solution, deposited on a warm slide. This preparation is covered with an ordinary thin cover glass, and the fresh and unstained material examined at once, without further preparation, using a 4 mm objective. If so desired, one may use, in order to bring out to some degree the nucleus in the living parasite, a small amount of very dilute neutral red solution diffused under the cover glass. Permanent preparations are best made by spreading the contents of the pocket on a cover glass and fixing, while moist, in a saturated solution of mercury bichlorid in alcohol, and afterward washing out the mercury with iodine and alcohol and staining by the Giemsa method. For diagnostic purposes, however, examination of unprepared material for the moving organism is quite sufficient, and in some ways advantageous, particularly in the matter of economy in time. Caution as to the maintenance of the warmth of the preparation should be insisted upon. . . . When seen in its living state, the organism is a gelatinous-looking cell, ranging up to about 30 micromillimeters in diameter, moving in characteristic amœbiform manner, and thrusting out, here and there, about its periphery, one or two thick lobose to digitate pseudopodia, with a distinct but scant ectosarc, best seen in the pseudopods and about their bases, and with a granular and more or less vacuolated endosarc. The nucleus is practically always invisible in the unstained specimen; in

stained preparations it is small in size and contains but little chromatin, in grains or scant threads. The nuclear membrane is thin and poorly defined, and the karyosome small. In the cytoplasm there are, at least in the larger examples, and as a rule seen best after staining, numerous coarse ingested bodies, remnants of leucocytic nuclei, or red blood cells, and often a large number of bacteria. Undigested red blood cells are occasionally seen in the living amoebic body; but these, if watched only for a few minutes, rapidly disappear, owing to the effectiveness of the amoebic intracellular digestive agents." This last observation has induced Chiavaro to the belief that the *endamoeba* has no pathogenic action; on the contrary, as it feeds on bacteria, it is probably an adjuvant in the autodisinfection of the mouth.

In order to establish, beyond a shadow of doubt, the pathogenicity of the *endamoeba buccalis* as the specific causative agent, Talbot and the Research Committee of the National Dental Association have justly pointed out that a great deal of research work still remains undone, as follows:

"Owing to the fact that the evidence indicating that *endamoebæ* are the chief causative factor in pyorrhea alveolaris is largely circumstantial, being based, in a great part, on studies of the *endamoeba histolytica* of amoebic dysentery, and since the evidence against this conclusion is quite incomplete, judgment should be withheld until further researches shall have established a sufficient number of the following data:

(1). The successful production of the lesions of pyorrhea alveolaris by inoculation with *endamoeba*, according to Koch's law that (*a*) an organism if it causes the disease must be present in all cases; (*b*) the organism shall be isolated in pure culture; (*c*) a pure culture, when inoculated into a susceptible animal, must produce the disease; (*d*) the chemical products must produce the same alterations.

(2) Or the successful production of the lesions by inoculation with some other organism, or organisms, or by some other means.

(3) Or the demonstration that the *endamoebæ* of the mouth are non-pathogenic, and are incidental or helpful inhabitants of the oral cavity as scavengers, not only harmless of themselves, but not producing either toxins or harmful enzymes.

(4) If the *endamoeba buccalis* is the chief causative factor in

pyorrhea alveolaris, why is the *endamoeba Kartulisi* found alone in so many of the typical cases?

(5) The establishment of the rôle of emetin, including a close differentiation between its amœbicidal and its bactericidal actions.

(6) The determination as to whether the beneficial action of emetin is that of an amboceptor, acting upon the bacteria or protozoa with their protein and toxin contents (the toxiphor group) through the agency of the complement, and also whether the action of emetin is that of a complement, as in the case of lecithin with snake venom.

(7) A determination as to what is involved in so-called bacteremia, which is clinically so common as a result of instrumentation and of certain medications, and is this action bacteremic, septicemic, or toxemic?

(8) The establishment of the precise local tissue changes involved in the development of the lesion of pyorrhea alveolaris and of the successive processes constituting its repair.

(9) The establishment of the precise rôle played by instrumentation in the process of repair of pyorrhetic lesions and the significance in this process of the removal of foreign material, bacterial plaques and degenerating tissue, also of polished surfaces, local stimulation of circulation by frequent massage, etc.

(10) The development of a means for the reattachment of vital tissue to dead and denuded cemental surfaces of roots.

(11) The establishment of the rôle of pyorrhea alveolaris pockets as culturing-places for pathogenic organisms, as those of the streptococcus-pneumococcus group, which from this lesion as a primary focus affect other organs and tissues of the body, and the establishment of the symbiotic effects of the organisms on each other.

(12) Granting that the endamoeba is the causative factor of pyorrhea alveolaris, and that emetin hydrochlorid is a specific for it, why has no pyorrhea pocket, of the many cases treated, been more greatly modified in the way of repair than the more or less marked improvement of the following factors—the quantity of pus flowing; the relative quantity of micro-organisms growing in the pockets and the general tonicity of the surrounding connective tissues, with practically no considerable change within several months, of the lesion of the alveolar bone surrounding the tooth?

(13) And chiefly, by the establishment of a mass of circumstantial evidence bearing on the above and related problems, which

shall be so carefully interpreted and tabulated that it will indicate the probable answers to most all of the above questions, before they can be clinically and technically established. This will best be done by as large a number of skilled observers as possible, including those skilfully treating pyorrhea alveolaris either as a local lesion, as a systemic lesion, or as both; those treating other diseases primarily, but also observing, competently, the effects on local mouth lesions, and those studying by intensive methods in pathological and bacteriological laboratories, etc., sending reliable statements of their observations and findings to some central committee or organization, such as the Research Commission of the National Dental Association, for classification and publication, a considerable quantity of which has already been received."

A few points deserve special mention in this connection, namely, that the *endamoeba buccalis* is found in the great majority of cases of pyorrhea alveolaris, also in the soft deposits upon sound teeth kept in unhygienic condition, but not in carious cavities in which the process of decay is actually going on and which therefore present an acid medium. It is also absent in serusal tartar. The observation that the endamoeba cannot live in acid media explains the fact that pyorrhea has been successfully cured under the old therapeutic régime of scaling, polishing and acid medication. This is, of course, a strong evidence of a symbiotic relationship between endamoebæ and bacteria.

EMETIN HYDROCHLORID AND ITS ACTION

While we are, then, still far from positive evidence that the *endamoeba buccalis* is the specific causative agent of pyorrhea alveolaris, we are absolutely certain of emetin hydrochlorid being the specific medicinal agent against endamoeba. This is all that Barrett and Smith claim, and for that reason, they stand on absolutely solid ground, far more so than Bass and Johns and many others who make their wishes the fathers of their thoughts. The mode of application of emetin hydrochlorid, by the marketing of which some progressive drug houses are reaping a rich harvest, consists in introducing a $\frac{1}{2}$ per cent. sterile solution with a hypodermic with straight or curved needle or a so-called pyorrhea pen to the bottom of the pocket or suspected tissue around which a line of vaseline has previously been drawn to retain the liquid longer. If the parasite has been

demonstrated to be distributed through the tonsils or elsewhere, and when systemic complications exist, hypodermic injections of from $\frac{1}{2}$ to 3 grains on successive days in the deltoid muscle are recommended by several writers. More or less painful local reaction may be expected from this form of medication, as may nausea be encountered from the local introduction of the drug. Barrett advises the introduction of iodine daily into the pockets, following the use of emetin. A mouth wash containing a fluid extract of chaparro amargosa, or internal medication by Alcresta ipecac tablets have been recommended as adjuvant treatment.

As for the success of emetin treatment, the reports still vary between enthusiastic professions of 100 per cent. successes and gloomy grumblings of 100 per cent. failures, though a marked reduction in the flow of pus and improved tonicity of the gingival tissue is usually observed. The most uniformly favorable effects seem to have been obtained in cases of constitutional complications, anemias, chronic joint diseases, chronic gastritis and psoriasis in which endamœbiasis appears to play a rôle.

CONCLUSIONS

In conclusion, the subject of pyorrhea alveolaris has been advanced a step in regard to etiology and treatment by the studies of the endamœba buccalis and emetin hydrochlorid. A definite solution of the problem is barely in sight, and the means and methods of treatment heretofore employed, especially the mechanical features thereof, still remain absolutely indispensable. Experimentation with emetin hydrochlorid and other ipecac preparations in conjunction with the formerly tried methods is most desirable to enable us to arrive at definite conclusions regarding the merits of emetin. Corroborations of the findings of Wright and White, regarding succinimid of mercury should come forth more profusely, as here a most promising lead has been struck. The microscope should become the reliable standby of every practitioner who, by using it in every case, will attest to the scientific standing of his profession and may perchance make invaluable discoveries. Prophylaxis should receive even closer attention; the duty of right living, which unfortunately has become an art and an irksome task under our modern conditions of hyperrefinement, must be ever impressed upon the patient, for if it is acknowledged to be true that *mens sana* is possible

only *in corpore sano*, the truth of the altered adage *dens sana in corpore sano* is even more patent. Last, not least, let us become reconciled with the thought that shotgun methods of pyorrhea cures have not as yet, perhaps never will be discovered, and that he who wishes to treat pyorrhea successfully had better become a skilfull, deft operator first, instead of pinning his faith to a hypodermic syringe.

THE RELATION OF ORTHODONTIA TO DENTISTRY.*

BY FREDERICK BOGUE NOYES, A. B., D. D. S., CHICAGO, ILL.

Mr. President and members of the Illinois State Dental Society:

The present is an age of specialization. Knowledge and skill have made such rapid advancement that it is impossible for any man to compass the whole range of knowledge or excel in many fields of execution. The engineer must decide whether he will follow some line of machine construction, factory construction, the development of hydraulic power, electrical power, the reclamation of land, or some other field of constructive endeavor. The physician must choose the study of the eye, the ear, the nose and throat, the stomach, the genitourinary tract or some other field. So also the dentist must choose between the treatment of the diseases of the hard tissues of the teeth, the treatment of the soft tissues, the construction of artificial dentures, the correction of malocclusion, or the extraction of teeth, for he cannot hope to excel in all of them.

This development of specialization demands a foundation of broad knowledge and skill, and their application in a limited field. No matter how limited the field of application,—knowledge of the fundamental sciences must be broad. No man can hope to push forward the knowledge of the bacteriology of the mouth without a good foundation in general bacteriology. No one can be a good oral surgeon without a knowledge of the fundamental principles of general surgery and training and experience in its technic and practice.

To rise out of mediocrity to a position of distinction, today requires vastly greater effort and attainment than a century ago. This is true because every specialized field is drawing from every

*Read before the Illinois State Dental Society, May, 1915.

department of science with increasing efficiency, applying the fullest development of each science to the accomplishment of its own end, and every department of science has made such rapid progress in the last few years that it would be impossible for any one to excel in them all. It is a mistake, however, to suppose that every new discovery in a department of science is revolutionary and destroys the work that has preceded it; and one who has once mastered the fundamentals of a science, may keep in touch with its advancement with comparatively little effort while he would not be at all in a position to carry on a new work in this field, to be in the vanguard pushing that line still further into the unknown. There always has been and there always will be two types of minds: the encyclopedic and the logical types, and each has its sphere in the development of any profession or science. The man with the encyclopedic type of mind knows and remembers what everyone else has said and thought on his particular subject. He can tell you when this article was published by that man and another article by another man and just the point of view of each individual. But when he attempts the investigation of a new field he is very apt in generalizations to miss the most important points and just as likely to emphasize the unimportant details and miss entirely the one central thing. In contrast to this type, the logical type compares accurately, sees clearly all individual facts, and recognizes the generalizations that can be drawn from them. He thinks clearly and works out an individual philosophy or interpretation of the facts to the best of his ability and in so far as he goes, truly, but he may be entirely ignorant of what anyone else's opinion has been in the same field. To a certain extent these two types are contradictory but they are not necessarily so. To draw a comparison from current military tactics, the encyclopedic type may be compared to the general who, conscious and posted continually as to every point and as to what is going on throughout the entire line, is not in direct contact with the men at all, and the officers who, entirely ignorant of what is going on at any other point on the battle front, are engaged only in pushing forward the attack, at their own particular points. In the development of a profession and the training of men for the pursuit of highly specialized fields, the broadness of the preliminary training should be emphasized to counteract the narrowing tendency of the intensive following of a limited field. The training should be planned not

simply to develop the highest degree of efficiency, and attain the most rapid advancement in a special field, but to keep the specialty in touch with the general profession and coördinate it with other specialties for the benefit of humanity.

The development of specialization as it is today has brought about the interdependence of the general practitioner of dentistry and the various specialties. And for the first time, it has brought the dentist into the same relationship to the diagnostician and the internal medicine man as are the other specialties in medicine. Now, for the first time, the physician is looking for and expecting the same co-operation from the dentist that he has been accustomed to look for and receive from the oculist, the rhinologist, and other specialists. A physician, finding a patient suffering from some condition which he knows to be caused by some local infection or inflammation refers the patient to the dentist for a report on his oral conditions, just as he refers the patient to the rhinologist for a report on the mucous membrane of the nose or the condition of the tonsils. The physician, in that case, is not concerned with the teeth as a masticating apparatus, but he wishes to know if there is any pathologic condition present, and if so, an intelligent report as to its character and extent, that he may have some judgment as to its relation to the general pathologic condition. If the dentist replies upon superficial examination that he finds the mouth apparently normal as a masticatory apparatus, without a detailed report as to the presence or absence of the inflammation of the gingivae, the presence or absence of suppurative pockets on the sides of the roots of the teeth, the presence or absence of suppurative conditions about the apices of tooth roots and their extent and character, and certainly if he replies without a radiographic examination of both arches to reveal the possible existence of suppuration within the substance of the bone,—he fails utterly from the standpoint of the physician. What the physician wished was the opinion of an expert in the given field's pathology that he could use as a basis for the organization of his campaign for the health and usefulness of the individual, and too often he is unable to get such reports. In such conditions, too, the specialist should remember the general systemic conditions which are present should govern him as factors in determining the character of the treatment to be used for the local condition. In a local suppurative condition, the treatment for a patient not suf-

fering from any systemic condition might be quite justifiable, which would not be justifiable at all for a patient showing manifestations of some grave general condition.

Just as the physician looks to the dentist for expert advice, so one specialist looks to another for the same character of expert judgment. The oculist may call upon the dentist for the same character of advice and treatment as is sought by the intern. The rhinologist, having removed a nasal obstruction and created normal conditions in the nasal pharynx, knows that normal respiration will be impossible till the malocclusion is corrected so that the normal respiratory functions can be carried out. The orthodontist, correcting a malocclusion in which teeth or the cusps of teeth have been lost or destroyed sends the patient to the general practitioner, for the restoration of the lost teeth or cusps, knowing that unless this is done the preservation of normal occlusion will be impossible. So the specialist looks upon the so-called general practitioner, as a specialist in his department.

To show you the importance of this particular matter, a concrete example is cited. In the correction of malocclusion in the writer's practice, an upper first molar was found in lingual occlusion. It had never been perfectly formed and caries had destroyed all of its cusps, an amalgam filling had been made which was as flat as a board. The patient was sent to the general practitioner to have this replaced by a gold inlay that would restore the normal-sized crown and the form of the occlusal surfaces. The patient returned with a gold inlay, beautiful from a mechanical standpoint, with perfect margins, but with cusps that resembled no tooth in heaven above or earth beneath, and from the standpoint of normal occlusion, utterly functionless. With such an occlusal surface there was no hope of maintaining the normal occlusal relations of that tooth.

I have dwelt upon the development of interdependence among the specialities and of the disappointment that is too often experienced, as the basis of an appeal for better types of specialists in dentistry. In medicine a man would not think of attempting to practice as a specialist without going to those places where material is abundant and devoting time, energy, and money to the study under the men of the greatest knowledge and skill. Developing there his own knowledge and experience in public clinics and hospitals under the direction of able men, before attempting to conduct private prac-

tice of a specialty. In medicine the means of developing and training specialists is a method well developed all over the world, but up to the present time there has been nothing corresponding to it in dentistry. At present the partisan, I had almost said "charlatan," who travels about the country exploiting some special method of treatment, often backed by some commercial house, claiming to equip men for the practice of some specialty, are a disgrace to the dental profession, and they exist chiefly, I believe, because educational institutions have failed to offer opportunities for special study and training and because the dental profession has not yet organized hospitals and infirmaries for the care of the poor of the communities who are unable for financial reasons to obtain dental services, and which should be the places for special training. There is just as much reason for providing dental service for the poor of any locality as there is for providing hospital service. Every state and public institution should maintain dental attendance as they do medical attendance, and in the future I believe it will be the function of the state dental societies to organize this service so that it will be the means of training specialists in dentistry, just as corresponding institutions are the means of training specialists in medicine. In medicine, the hospital and public infirmary has grown out of the medical school and the university. In the same way I believe that the first step is the development in the universities and dental schools of adequate means for training specialists in connection with hospital and infirmary service. Such a development, however, requires the proper point of view of the profession in general. In the past, dentistry has been too ready to accept the short course of a few weeks as a training for special practice and it is a grave question whether men would devote a year's time in the pyorrhea service or the orthodontia service in a dental hospital as men devote a year or two to an interne service in such an institution as the Cook County Hospital, in the eye, ear, or surgical service. But I believe that if such fair training could be offered under adequate supervision coupled with thorough courses in the allied sciences, there would be many young men of great ability who would avail themselves of the opportunity.

Orthodontia is a specialty of dentistry, in just about the same sense that dentistry is a specialty of medicine. For the training for general practice of dentistry does not train a man for the practice of orthodontia any more than the training for medicine equips a

man for the practice of dentistry. The good of both orthodontia and dentistry depend upon the admission of this relationship. As evidence of the great development of orthodontia in the last few years, one has only to notice the great number of children wearing appliances and the large proportion of space in dental literature devoted to the subject. But as I view it there is bound to be reaction. For too large a proportion of the men practicing it are utterly untrained either in the theory or the technic of orthodontia. The result must be an enormous crop of failures. I believe that eventually every fair-sized city will have its orthodontist, supported by the dentists, just as at the present time every fair-sized city has its surgeons supported by the general practitioners. But this condition for orthodontia can never come until there are a sufficient number of institutions presenting courses which will adequately train men for practice.

The development of transportation facilities in the interurban electric railroad, and the enormous increase in the use of the automobile will favor the development of specialists in the smaller cities for it increases the area from which specialists may draw patients, but in addition to these favorable conditions, there is needed the growth of a feeling of co-operation between the individuals of the profession in order to maintain a specialist, except in the largest cities. Men in a given locality must allow the one among them with the greatest ability and liking for a given specialty to go where he can receive the special training and practice necessary for the practice of that specialty, and then if possible refer all such cases in that locality to him for treatment. Such a method would be greatly to the advantage not only of the community but of the profession.

THE THERAPEUTIC VALUE OF EMETIN HYDROCHLORID IN THE TREATMENT OF PYORRHEA ALVEOLARIS.*

BY ALBERT E. CONVERSE, D.D.S., SPRINGFIELD, ILL.

We are living in a day of prophylaxis. Never before in the history of the world have the energies and talents of men of science been so extensively employed in the prevention of disease. The

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results of this propaganda are evident on every hand. The virulency of certain diseases has been greatly reduced. Other diseases have been almost eradicated; while the average duration of human life has been materially increased.

The inevitable has happened, however. The medical profession having committed itself to this campaign of hygiene and prophylaxis, has been confronted at the outset with the oral cavity, the great port of entry for the food supply of the entire human system. Realizing perforce the paramount importance of oral hygiene, the medical man has called to the assistance his brother, the dentist.

The words of Dr. Charles H. Mayo are still fresh in our ears: "It is evident that the next great step in medical progression in the line of preventive medicine should be made by the dentists. The question is: Will they do it?" Thus, while the dentist's responsibility is no greater than it has been in the past, he is made to realize it more keenly.

In view of all this, as the dentist contemplates his particular field of action, the problem offered by pyorrhea alveolaris becomes even more perplexing than before. Unless the dentist can cope with this disease far more successfully than in the past, he will fall greatly short of achieving anything like a hygienic condition in the oral cavity.

At a time so critical, when it might fairly be said that dentistry is being weighed in the balance, the announcement of a new and, according to claims, efficient method of treating pyorrhea, would seem to be most opportune.

The reports of the preliminary experiments with this new method are glowing, in fact astonishing. We read the accounts with intense interest. We seem to see in the near future myriads of mouths freed from this loathsome disease and made clean and wholesome. The prospect is most alluring, and yet we hesitate. We would like to believe that we are looking at the promised land, but are fearful lest it be a beautiful mirage that upon closer investigation will vanish into thin air.

The treatment under discussion is based upon the theory that oral endamebae are an etiological factor in pyorrhea alveolaris. The theory is not without supporting evidence, for recent investigations have brought out the significant fact that the endamebae are almost universally present in pyorrhea pockets.

As to the evidence relative to the absence of endamebae in normal mouths, the findings are apparently not altogether conclusive. Dr. Barrett in a paper read before the Pennsylvania State Dental Society July 1st, 1914, reports seven normal mouths in which the endamebae were not found after prolonged microscopic examination.

In a report of his investigations on the endamebae buccalis read before the American Dental Society of Europe, by Dr. Angelo Chiavaro, the statement is made that no endamebae could be gathered from the interdental spaces of sound teeth kept clean with tooth brushes and dentifrices; but that endamebae were found present in the soft deposits in the interdental spaces of the same teeth after several days during which they had not been cleaned.

Bass and Johns of New Orleans argue that the constant presence of endamebae where pyorrhea was present, and the absence of the endamebae in the absence of the disease coupled with the rapid recovery from the disease following the administration of an amebacide, serve to prove beyond a reasonable doubt that the ameba is the specific cause. They further point to the fact that no better proof existed relative to the pathogenicity of malaria plasmodia until very recently, when they succeeded in growing the parasite in pure cultures, from which experimental inoculations could be made.

We are now brought to a consideration of emetin hydrochlorid, the amebacide referred to by Bass and Johns.

For a number of years ipecacuanha has been administered in tropical dysentery or what is now known as amebic dysentery. This remedy was exceedingly unsatisfactory, however, because of the extreme nausea produced. In 1912 Dr. Leonard Rogers of Calcutta discovered that emetin hydrochlorid administered subcutaneously would cure amebic dysentery without causing nausea or other unfavorable symptoms. The medical profession was not slow to appreciate the value of this remedy and it now has a recognized place as an amebacide and a specific for tropical dysentery.

When, as a result of the investigations of Barrett and Smith, the presence of the amebae were demonstrated in pyorrhea pockets, the obvious remedy was emetin hydrochlorid. This

Barrett and Smith administered locally, a one-half per cent solution being injected daily into the pockets about the affected teeth. The effect of the treatment was apparently most satisfactory. The pus disappeared in from one to three days, the gums became firmer and more healthy in appearance, and the teeth became tighter. Further, no amebae could be found after the second or third administration of the drug.

In the experimental work of Bass and Johns, emetin hydrochlorid was administered hypodermically in half-grain doses daily, for from 3 to 6 days. They also used a preparation of the alkaloids of ipecac administered by mouth. The results of these experiments as reported were practically the same as those cited by Barrett and Smith.

As to the permanency of the cure, if the improved conditions may be referred to as a cure, the short space of time that has elapsed since the institution of the treatment would necessarily render any opinions advanced under this head purely speculative. The investigators, however, seem to all agree that reinfection is not only possible but probable.

Bass and Johns found reinfection in about 12 per cent of cases within four weeks after the emetin treatment was given. This recurrence of the disease necessitated another course of the emetin treatment, the theory being that the treatment should be kept up from time to time until the lesions had all healed.

As an aid to the hypodermic treatment, also as a prophylactic measure, the use of fluid extract of ipecac, either a few drops on the tooth brush, or in dilute solution, as a mouth wash, was suggested⁴ by Bass and Johns.

In a paper read before the St. Louis Dental Society, April 13th, 1915, Dr. Barrett described the technique of his method of administering emetin. It was in substance as follows: A syringe with a blunt pointed needle is used, the needle being introduced into the pocket and moved sidewise as the emetin is being expelled. On withdrawing the needle, the pocket is left filled with the drug. The side of the pocket is not to be punctured nor injured by the needle.

Dr. Barrett recommends daily treatments in this way for 5 or 6 treatments, then every other day for 5 or 6 more treatments. As to scaling, he stated emphatically that he did not

want the impression to gain prevalence that he did not favor the removal of calculus, as he realized that deposits must be removed in order to effect a cure. He cautioned, however, against undue injury to the soft tissues as a result of instrumentation.

He favored the local application of emetin rather than the hypodermic, arguing that while the hypodermic injections would undoubtedly kill all the amebae that had penetrated the tissues, that amebae on the surface of the tissues might escape.

Having eagerly devoured everything he could find on the subject, the writer became obsessed with a desire to try out the new remedy. If he had any idea that this impulse gave evidence of any peculiar originality on his part, or that it was an indication that his was one of those progressive natures calculated to blaze the way for others to follow, if for a moment he allowed himself to float among the clouds with such a notion concealed about his person, he came to earth with a jolt. He discovered that practically all his brother practitioners were fully as much interested in emetin as he was, and that some of them had even started to use it.

It further developed that the laity were only a lap behind the profession. Articles on the new treatment appearing in various newspapers were not without their effect. Patients with clean firm teeth and healthy pink gums would recall with terror that once upon a time the gums had bled a little somewhere up in the northeast corner of their oral cavities; and forthwith they would apply for a course of treatment with the wonderful new drug.

Having become convinced that there is widespread interest in the profession relative to the amebic theory of pyorrhea and the emetin treatment, the writer conceived the idea that the members of this society might welcome a little information as to what results are being achieved by the employment of emetin hydrochlorid in routine practice. With this idea in mind, he wrote to a number of practitioners over the state asking for a record of one or more cases treated with emetin.

As a result of these requests, he now has in hand records of 59 cases treated. These records indicate that 39 of the cases showed improvement, while in 20 of the cases there was no appreciable result from the emetin treatment.

Of the 39 cases where improvement was apparent, in 27 cases the emetin was injected in the pockets about the affected teeth; in four cases hypodermically only; in six cases both in the pockets and hypodermically; and in two cases internally only, the alcresta ipecac tablets being used. The number of administrations in a single case ranged from two to twenty-five, the average, however, being six.

In eleven of these cases the operators reported that there was still some pus about one or two teeth either immediately after the course of treatment or a few weeks afterwards. In the remaining 28 cases the operators used such expressions as "cured," "apparently cured," "pus stopped and gums normal," etc., etc.

Of the 20 cases evidencing no improvement, in 13 cases the emetin was injected into the pockets; in one case into the alveolar process about the teeth; in one case into the pockets and into the alveolus; in three cases hypodermically only; in one case in the pockets and hypodermically and internally; and in one case in the pockets and internally. The number of administrations in a single case ranging from three to 33, the average being 12.

The following are some of the remarks which several of the operators appended to their reports:

"Am neither swearing by it nor at it, but am trying it out and hoping that it or something else may really prove to be the panacea we have been looking for."

Another writes: "I consider the emetin the best treatment so far, though I am not ready to call it a specific nor say that it will cure all cases."

From another: "Have discontinued emetin, as I have not seen any results in thirty-odd cases; and I can get results in following my usual treatment—instrumentation."

The following from an operator who reports six cases without results, though the emetin was injected in the pockets in each case from 10 to as high as 33 times:

"All these cases have improved very much by further prophylactic treatment, proper hygienic measures and the use of various douches, such as dentinol, peroxid of hydrogen, and normal salt solution. The emetin seemed to give the whole mouth mucous

membrane a healthier look, which, however, may have been due entirely to prophylaxis and personal care by the patient. My reason for not using emetin hypodermically was that I find endamebae with and without dento-alveolitis and do not consider the protozoa specific at all."

An operator reported three cases in which the flow of pus stopped entirely as a result of emetin treatment, but returned about as before in six weeks. He writes the following:

"From my experience as above, I lost interest in emetin at the start, but am now interested in the alcresta ipecac tablet for internal administration and am about to try it out with an ipecac mouth wash."

The records would seem to indicate the internal form of administration is not popular, it having been used in four cases only. In one case the operator reports that after 20 tablets had been taken by the patient the treatment had to be discontinued because of diarrhea.

In this connection, the writer tried taking the alcresta ipecac tablets himself. It may be of interest to note that after taking about 30 tablets he was forced to desist, he being much moved, though his tendency was not to tears. He could not discover that the treatment had any particular effect upon his teeth or gums.

While realizing that we are still considerably in the dark concerning this treatment, the writer ventures to draw the following conclusions, offering them for what they may be worth:

First—Emetin hydrochlorid has a beneficial effect on some cases of pyorrhea.

Second—Emetin hydrochlorid will not cure all cases of pyorrhea, and cannot, therefore, be termed a specific for the disease.

Third—Removal of deposits and proper instrumentation is necessary in connection with the emetin treatment.

Fourth—The best method of administration is probably a combination of hypodermic injections and injections into the pockets.

Whatever be the final verdict relative to this treatment, there has been one excellent result, in that the general public

has had its attention directed to the prevalence and the serious nature of pyorrhea.

In conclusion the writer wishes to express his appreciation to the following gentlemen who kindly assisted him in gathering data: Drs. Scott P. Bowyer, E. T. Evans, G. N. Gilbert, R. L. Graber, F. A. Houchen, E. F. Hazel, W. A. Hoover, Austin F. James, R. N. Lawrence, J. P. Luthringer, Grafton Munroe, G. C. McCann, Frank H. Skinner, A. G. Smith, H. H. Schuhmann, J. F. F. Waltz, William F. Whalen, J. E. Nyman and others.

DENTAL PATHOLOGY WHICH MANIFESTS ITSELF
AS AN ETIOLOGICAL FACTOR IN DISEASES OF
THE EAR, NOSE, AND THROAT, AND
VICE VERSA.*

BY G. C. OTRICH, M.D., BELLEVILLE, ILL.

In the opening of this paper, I desire to sound a keynote which I hope the members of this honorable society will carry home with them, and impress upon their colleague physicians, and this I hope you shall make a slogan for them—"When the patient opens his mouth, look for coated teeth instead of a coated tongue, thereby discovering the etiological factor for more diseases than the tongue will show, by far." I shall broaden my statement by saying the mouth shows more macroscopical pathology than all the remaining visible anatomy.

Scientific research of recent years, showing the high relative percentage of the systemic infections following primary infections of the teeth or adjacent structures, has been one of the most important and worthy steps of the professions, but as my paper is to be limited to the diseases which come under the observation of the dentist and oto-laryngologist, I shall endeavor to show the infections of the teeth as spread by two ways: First, by continuity, and second, through the lymphatic system, and also deal with reflex neurological conditions which are due to the complex nerve distribution.

The diseases which come under my observation, due to continuity, are limited, but of utmost importance. They are the

*Read before the Illinois State Dental Society, May, 1915.

diseases of the antrum, the inferior wall of the antrum being the base of the alveolar process, and in many cases the apices of the roots of the molar teeth, of one or both of the bicuspid, and sometimes, but rarely, the cuspids are in very close relation to or may extend into it. Therefore you all realize how very readily any pathological process or irritation may have a direct entrance into the antrum.

In my experience, the diseases of the antrum following some one of the many pathological changes of the teeth, are about 90 per cent or more.

I shall give you the history and findings of several cases to show the difference of close observation on the part of the dentist.

Mr. S. was referred to me by Dr. Gunn, an oculist, for an examination of his nose in regard to suppuration of some one of his sinuses. His vision was greatly impaired, due to retinal and optic nerve changes, presumably to sinusitis. The patient complained of a foul-smelling discharge from the nose, which was present at time of examination. He had had neuralgic pains on the same side of the affected eye. So as my rule goes, "Always examine the teeth first," I did, and found where a third molar had been extracted a short time before, and a treatment in the second molar on the same side, and upon questioning him, I ascertained that he was under the care of his dentist, who had told him the pain was due to the treatments in his teeth, and would soon pass off. I immediately suspected the antrum, though it did not show any physical signs, made a puncture in the inferior meatus, and washed and drained one of the worst cases of antrum infection I ever saw. This case is so plain that you may readily get the connection without further discussion, except that it shows some carelessness on the part of the dentist.

Case No. 2: Referred to me by Dr. Conroy. This patient showed physical signs of toxemia, such as loss of weight, malasia, headache, and nervousness. The dentist found several teeth in very bad condition. These teeth all responded readily to treatment except one, a left bicuspid, which did not respond as readily as it should to the treatment of the canal, nor did the physical conditions clear up as rapidly as the doctor thought they should, so he was suspicious of antrum trouble. I examined him; nasal affection neg., physical finding neg., transillumination neg., re-

ported same to dentist and asked whether I should make a puncture, which was the only sure way of diagnosis. He affirmed this suggestion, and pus was found; a micro-purulent variety. After treatment the physical symptoms cleared up and the dentist was able to save the teeth. I have also a couple of cases of carcinoma of the antrum, which might prove of interest.

Mrs. Q. was confined to her bed for several weeks with slight swelling and pain in the superior maxillary. She had only two upper teeth on that side which had pyorrhea and were loose, so the family physician pulled them, suspecting an abscessed condition, but with no relief. They called another physician, who lanced the indurated tissue, and by probing, found what he thought was loose bone, and suggested getting their dentist. Dr. Bischof was called, and as it was a long country trip, he asked me to take a ride with him. When he observed the case he asked me to examine it. We agreed that it was carcinoma, took a clipping, had a microscopical examination made, which proved it to be carcinoma, but too late for any interference, as the lancing of the gums and probing for loose bone had acted as oil on fire. I think this case was due to an irritation of the teeth and lack of proper attention.

Just one point I wish to make—you rarely see metastasis to any extent in cancer of the antrum. The disease spreads through the ethmoid cells and causes death by pressure.

In dealing with the relativeness of the teeth and gums to the lymphatic system, I ask you to bear with me if I step a little out of the bounds of my limited subject. The oral and nasal cavities, which are exposed to infection more than any other portion of our bodies, have had special attention given to their defense. This defense is the adenoid and lymphoid tissue. It is so situated that it completely surrounds the intersection of the oral and nasal cavities and is named after the man who first showed their relative connection, Waldeyer, and known as "The Ring of Waldeyer," and is made up of the pharyngeal tonsil as adenoids; second, eustachian tonsil, a small accumulation of lymphatic follicles situated on the posterior lip of the orifice of the eustachian tube; third, the palatine tonsils, commonly called the tonsils; fourth, the lingual tonsil, which is at the base of the tongue, just in front of the vollicule. These comprise

the inner ring, or ring of the first defense. The outer or second ring is composed of the retro-pharyngeal glands, styloid glands, lateral pharyngeal glands, the superficial and deep cervical glands, sub-maxillary glands, and the hyroid and sub-hyroid glands.

Tonsils are composed of collected groups of lymphatic cells called follicles, these being held together by bands of connective tissue. The surface of the tonsil is irregular, indented with crypts or sulci, and into these open the ducts of the muciparous glands, which are situated in the stroma below the level of the follicles.

By taking up the function of the inner ring of Waldeyer, I want you to understand I am not looking for an argument, for theories of the functions of the tonsilar tissues are many. We know that they produce lymphoid cells and have a peculiar mucoid secretion; further than that I am at a loss to say. There is a marked development of the tonsilar tissue in the last months of intra-uterine life, and in most individuals a marked atrophy before the adolescent period. This is in favor of their rudimentary character. You have all been confronted by the laity regarding their functions, or as they say, "What are they there for?" This is my answer, and I have found that it has satisfied most all of them: "They are placed there to protect against any infection which the child might breathe or take in through its mouth, and act as a filter, like a sponge placed in a funnel to catch the dregs, and so with the tonsil, as with the sponge, after it has taken up a certain amount, its efficiency ceases and it becomes a port of entry and incubator for micro-organisms, and a foreign body as far as the general good is concerned."

It is through the tonsil that quite a few of the infections of the systemic diseases enter our system, following the infection of the teeth and gums. I can positively say that carious teeth or pyorrhea conditions have direct effect upon the lymphatic tissue of the pharynx and larynx. In many cases of chronic laryngitis, pharyngitis and tonsilitis, that would not respond properly to treatment, I have observed carious teeth, and in a great percentage of pyorrhea patients you will find hypertrophy of the lymphatic tissues of the post-oral space. I will give you the history of cases that will be self-explanatory of their relations.

Mr. M., 50 years old, came to me for a gradually increasing hoarseness which had become very pronounced, also complained of post-nasal secretion, slight loss of weight, and increased nervousness. The first thing I found upon examination was a bad case of pyorrhea, and told him that with his mouth in that condition, I would not be surprised at whatever further I found. Further examination showed catarrhal condition, post-pharyngeal wall with hypertrophic lymph follicles, redness and slight swelling around the aretnoids and thickening of the vocal cords; in all, it had the appearance of the beginning of tubercular laryngitis. I gave him palliative treatment and referred him to my colleague, the dentist, and it was only a short time until there was a general improvement and an ultimate cure. This shows that infiltration of the tissues was due to the hyper-activity of the lymphoid tissue from the infection from the pus pockets around the teeth.

There is one more gland in Waldeyer's ring of the utmost importance to the dentist. I wish to call your particular attention to this one. It is the adenoid. I think this has the greatest effect upon the fields in which the dentist and rhino-laryngologist are both interested. More than any of the others, it is the one subject that the dentist should acquaint himself with, and should be prepared to make as thorough an examination of, as he does of the teeth; that is, if he has the interest of his juvenile patients at heart, and has any regard for preventive medicine. When the child comes to his office and he observes he is a mouth breather, inclined to be backward, excessively nervous, and upon oral examination you find a typical rodent face, high V-shaped arch, irregular teeth, dry mouth, spongy gums bluish in color, and dental caries and tartar which you think is in excess, considering the age of the patient, your suspicions should be immediately aroused as to whether or not the child has adenoids or some other nasal obstruction which should have immediate attention. For these symptoms are positively indicative of their presence, and the treatment you give directly to the teeth, is not worth the time spent, exclusive of your fee, if you do not consider the etiological factor of these conditions. You may consider this a strong statement, but the reason I make it is this: I know of one city where the oral hygiene movement was instituted and there were about 7,000 children examined. There were ten dentists who did this

work, and of the ten only two or three were considerate enough of their positions and to what was due these juvenile patients, to mark upon the slips which were to be given to their parents, "Suspicion of adenoids," and you will be surprised to know that these few men were criticised by some of their colleagues, who suggested that they had no right to do it as it was out of their line. Now, gentlemen, how can we expect the dental profession to be instrumental in eradicating the grave and serious conditions which exist among our children when we confine our observations strictly to teeth alone, and are lax in observing the defective adjacent structures, which in the majority of cases are only presented incidentally for the consideration of the dental surgeon? From my point of view it seems that the dentist is lax, deliberately or unconsciously, in recognizing these relative lesions, and would say that he is not doing his duty in the capacity and sphere which he occupies.

I shall now endeavor to bring out a few of the conditions which bring our relative fields closer than before. This is due to the fact that they are under the control of the same set of nerves, the facial and trigeminous. The difficulty of diagnosing, with which one is so often confronted, is due to the fact that there does not exist a close relation between the dentist and oto-rhinologist, and the fact that we do not have a precise conception of the ramifications and associations of these nerves, therefore it is almost impossible to make an ironclad diagnosis of the multiform symptomatology which may be present, due to the irritation of some one of the many branches of these two nerves, considering the many tricks which may be played on us by the reference of pain to some distant point where there is no pathological change taking place. Frequently we see cases of sinus disease where the pain is referred to the teeth, and vice versa. I have also on record innumerable cases where the lesion was in the teeth and the pain referred to the ear. The pain may also be referred to some other distant point because of the fact that the anastomosis of the fifth nerve with some of the sensory branches of the cervical nerves through sympathetic ganglion and plexus.

The important fact to bear in mind, is to follow up as near as possible the particular nerve filament which is giving the manifestations of trouble, and if it does not respond to your tests or treatment, remember your nerve supply and trace each one until you find the one which will respond to the primary irritation. With this, as

with the other subjects, I shall give you a few cases to demonstrate the above. Miss M. had been suffering for several years with a slight fullness and pain in her left ear. She had been treated by another physician who had removed her adenoids and had given her ear a series of treatments. Upon examination I found submerged tonsils, which she said would give her trouble five or six times a year. I removed them and still the ear condition did not clear up as it should, so I examined her teeth, suspecting that there might be a referred pain. I found her teeth in fairly good condition, except that there was a partially impacted third molar on the same side as the ear which was manifesting the trouble. I referred her to a dentist who extracted this tooth. A few days later she reported at my office and I was glad to hear that the ear condition was much relieved, although the pain was much increased the day after extraction, which shows that it was due to the irritation and trauma of the operation. This proved conclusively that this impacted third molar was the trouble maker. My conscience bothered me that I had not examined her teeth more closely on the first visit, but my consolation was that I found the trouble maker, which was, "Better late than never."

Case No. 2—Miss G. had severe pains in her external ear, which was increased by opening her mouth or masticating. She came to me thinking she had a furuncle in the external canal. Examination showed an apparent arthritis of the articulation of the condyle of the inferior maxillary in the glenoid fossa, but it was almost impossible to convince the patient that it was other than her ear. I examined her mouth. I was much surprised to find the existing condition that was present. The snags and roots were simply awful. I took her to the dentist and had a general extraction, gave her an alterative and waited for results. The pain subsided within the next few days, which proved that it was a referred pain and due to the teeth, rather than an arthritis of the joint.

In conclusion, I hope you appreciate the importance of the conjoined work of the dental and medical professions, which will have a tendency to bring about one of the most pronounced steps in preventive medicine, and when you return to your respective homes, carry to your colleague physicians my slogan, "Look for coated teeth rather than coated tongues," and for yourselves, don't forget the ring of Waldeyer and its relation to your work.

THE PROPHYLACTIC AND ECONOMIC PHASES OF
SCIENTIFIC AMALGAM RESTORATIONS.*

BY DR. W. G. CRANDALL, SPENCER, IOWA.

Friends of the Minnesota State Dental Association: I assure you it is a pleasure and a privilege that I appreciate to appear before you this evening, on this subject, which is of such great interest to me. I am very sorry that you are all so tired out, and I feel like going through this very rapidly, and cutting it down and giving you only some parts of it. I know you would appreciate it more. I am tired, myself, and it is too much to ask any person to sit and listen to a lecture at this time.

I should apologize to those men who are to discuss my talk, for not giving them my paper. There are a good many reasons why I have not done that. Most everything I have to say has been published; it would require too long a paper for me to say what I want to say. I am going to talk rapidly and get it out of my system, and the men who are to discuss the paper are those who can handle it very readily, I know, without any further assistance from me.

As to the prophylactic and economic phases of scientific amalgam restorations, we know from experience and from visual observation that there is a prophylactic value to amalgam. We have seen hundreds and hundreds of cases where amalgam fillings in cavities have preserved the teeth from decay for years and years. It is not our object to make operations of this kind, of course, but there is some inherent virtue in the metals which is deterrent to the carious action which takes place in the teeth, and there is a prophylactic value to amalgam in the restoration of form that is of equal value of other filling materials. Form may be restored by amalgam, as well as by inlays or crowns or any other material. From an economic point of view, amalgam has a place, because there is such a vast amount of operating to be done, to be done properly and scientifically, that it would be impossible for us to restore all of these teeth to their functions with gold foil or inlays. It is out of the economic question for the vast majority of people to have this kind of work done. Now if, by some sort of scientific manipulation, we can restore the

*Lecture before the Minnesota State Dental Association, June, 1915.

teeth to usefulness with amalgam, I believe we should look thoroughly into it. It is a matter of fact that a great percentage of restorations are made by amalgam, and I believe you will agree that they are made without very much thought; they are certainly made without very much scientific consideration. For that reason, I believe we should give to this one material a little more thought and consideration if we are going to use it; consequently, I have a few things to show to you along this line, this afternoon, which I hope may be of some interest and give some light.

Good amalgam work compares favorably with gold foil work. I think the gold inlay has nothing on it, in the matter of large restorations. I am convinced of this because of what I have seen.

Now, something as to the scientific restoration with amalgam, which will give us prophylactic and economic value.

Alloys.—Dental alloys are a combination of two or more metals. This combination in dental alloys is usually composed of chemical compounds and solid solutions. But this enters into the chemical side of the question which we should not take up at this time, as we have too much to consider, and that is a subject by itself. Amalgam is a chemical compound very largely of alloy and mercury and carrying a solid solution or undissolved portions. The chemical compound in alloy has been found to be largely Ag. 3, S. N. The metals entering into the alloy are silver, tin, copper, zinc, gold, platinum, and occasionally others.

The principal metal entering into dental alloys is silver. Silver is the element of strength in alloys; that is where we get our hardness and our great strength. As its ratio increases it causes the mass to work hard and to set quickly.

Tin is a modifying metal and overcomes some objectionable features of silver. It is a weak, crystalline substance, and flows readily under pressure, and causes shrinkage when added to the alloy, or overcomes expansion. It increases flow, resists setting action, and has good color.

These are briefly the points of these metals.

The next important metal in alloys is copper. Copper has the property of adding strength to dental alloys. Alone it would have no action. It expands when alloyed with other metals; when used alone it neither shrinks nor expands. It has one bad feature—it discolours.

Zinc, which is combined in most of the alloys today, is a material for which I have no use. I have always fought it, and shall continue to do so until I am assured that I am mistaken. Zinc is an amphoteric electro-positive element. It is an element which is not easily alloyed. It does not enter into compounds in the alloys as do other metals. It tends to go off by itself in pockets and rise to the surface of alloys, and it does not form definite compounds as do the other metals. The mere fact that it is electro-positive and high up in the scale, is one of the best arguments why it should not be used in dental alloys. Where it is united with copper and mercury—negative elements—it forms a cell, and a certain galvanic action will go on whenever this substance is immersed in a weak acid or weak alkali or water. It continues action until the zinc is either destroyed or has been coated by hydrogen and further action cannot take place. The salts formed by this action will always expand, and the zinc itself will consequently act as an expanding agent in alloys.

Largely from the cells that are formed where zinc is used, you will find, in the cases of amalgam fillings, that there are shocks caused by the amalgam coming in contact with other metals. The shock is caused by the zinc action going on in the mouth. It is very seldom experienced in amalgams that do not contain zinc.

Zinc is often soluble in water and will continue to dissolve until the surface is fully oxidized.

Gold, platinum, etc., are very seldom used in dental alloys and really have no value so far as I have been able to ascertain.

Now, you might take 73 per cent of silver and 27 per cent of tin at a certain degree of heat and make an alloy which would be actually balanced, which would not shrink and would not expand; while, if you took these metals cold and mixed them, there would be a different result. This is one of the first items of knowledge we had, of importance in the process of alloy making. These are some of the reasons for non-zinc alloys, the reasons why zinc should not be used in the mouth at all.

The only scientific way we know of making alloys is by the use of the enclosed electric furnace, where the gas is passed over the metals to prevent oxidation. The furnace is under absolute and accurate thermal control, so that the alloys are gotten into the proper solution.

The next process is the annealing process. We speak of aging—

but this is a different process entirely, for Dr. Black found that he could produce annealing in about ten minutes by dropping his filings of alloy into boiling water, for fifteen minutes, placing them in test tubes, and immersing the tubes in boiling water. He could produce the same effect by the use of hydrogen or nitrogen,—in twelve hours, at 150° F.,—or 60° ordinary room temperature. This shows the importance of the annealing process. All alloys should be annealed to what Dr. Black calls the zero point. Where the annealing process is carried beyond this point the alloys form a weaker compound. You should have some method of knowing the age of your alloys, so that you can use them properly in forming amalgam.

As to obtaining the balancing of alloys so as to form a balance of amalgam. They are carefully weighed, and any balancing of the opposing action or expanding action of silver or the shrinking action of tin, is adjusted very carefully, so there will positively be no shrinkage in the amalgam.

The filling is placed in a micrometer as soon as it is made, the same as for the tooth, and its exact measurement is taken. It makes no difference what it is, to start with, but as the measurements are followed up, we determine whether the amalgam is shrinking or expanding, and then supply whatever is necessary in the material for use in the human tooth.

I will not take the time to discuss a formula for alloys, except to say that it is impossible to make or give any exact formula for an alloy to be depended on at all times. This is not desirable; it should have various expansion, sufficient to be sure that a reasonable amount of abuse would not cause the filling to shrink.

Now, something as to the effect and dangers of shrinkage, I showed you in the clinic this morning a tube in which I had made a test filling a few days ago, and under a very low power microscope you could see a little canal about the filling. This could be seen with the naked eye, if you strained your eye a little. There was over 40 microns of shrinkage in that filling. The micro-organism of decay measures about $\frac{4}{10}$ micron. Where there is such a shrinkage as that which I showed you this morning, many of these little organisms pass into the fissures, and there will be trouble soon. The first apparent difficulty with shrinkage of amalgam fillings is pain from the eating

of sweet food. So often in our amalgam operations we have had patients complain that sweet food caused pain. We have examined the fillings carefully and found nothing wrong. But this is an explanation of why the sweet food gave pain. If your amalgam is not shrinking, and if you have thoroughly filled the cavity, this will not occur. The next feature of the shrinkage will be discoloration of the tooth,—not of the filling. Where the filling remains tight against the wall, and moisture cannot enter, there will be no discoloration; it may be removed years hence, and the surface of the amalgam will be very bright.

We have heard about pressure tests. They are made for the purpose of determining the adaption of amalgam to the walls. Dr. Harper claims he was able to get tight amalgam fillings by using a certain method of manipulation, but there are other considerations to be taken into account.

Also, we must consider that amalgam bulk changes occur with temperature changes. In a great many of these tests the thermal phase has never been taken into consideration, and for that reason the tests are of very little value. The mercury does have some effect on the expansion. If you have an expanding alloy, an excess of mercury will cause an additional expansion; and it will cause a closely balanced alloy to first shrink and then expand. I have a great many tests that will bear me out in this statement.

One of the things of paramount importance in scientific amalgam restoration is cavity preparation. This is similar to that for gold foil, with very few changes. We should have our flat seats, parallel walls, proper extensions of margins, and the proper amount of resistance. There are one or two minor changes I would make from those for gold foil; that is, for one thing, the step should be cut a little broader. We must be careful here that we do not extend the step to an area that will involve the pulp, and we should not approach the summit of the cusps where the enamel rods lie, in a direction which will cause poor margins. We should have our fillings as strong as possible between the occlusal and proximal portions of the cavity; where the cusp has been weakened by decay, or where there is any danger of fracture, it should be cut away for at least one-third the occluso-gingival diameter of the tooth, and restored with a

bulk of sufficient substance that will not fracture, because the strength of the amalgam increases rapidly as the bulk increases. It does not have the toughness of gold foil; it is a combination, and you cannot expect it.

There is another little change that we must take into consideration in cavity preparation for amalgam. That is the margin. Dr. Black tells us that the margin should be beveled one-quarter of the depth for gold foil, but for amalgam this would not be satisfactory.

We should make nearly a right angle at the margin of the cavity and avoid the thin edges.

Regarding the beveling of walls, we should take very earnest notice of this matter before the filling is placed. It is our last opportunity. After the filling is in, it is too late, and where a sharp enamel ridge is to be made, it cannot be rectified later on.

Regarding strength: The strongest amalgams are found in alloys containing about 75 per cent of silver; and 5 per cent of copper will increase the strength, causing the least flow and highest fracture point. Alloys containing zinc are not so strong.

I wish to caution you about the heating of amalgam during or after the making, which causes loss of strength. The alloys should be weighed before you use them, to obtain proper proportions of alloy and mercury to be used. When they are weighed, they should be placed in a mortar and pestle, or in some article in which we can incorporate the alloys with the mercury. You may shake it up in a bottle, if you can get the results that way. The mixing in a mortar and pestle should not be heavy grinding; it should be only a light manipulation of the pestle in the mortar, to incorporate the granules,—or held in the palm and manipulated with the hand until sufficiently formed and knitted together.

In large restoration work I would throw out this caution to you—not to over-carve. There is a tendency to overdo the carving, and when we overdo it, we are just as badly off as if we hadn't done it at all, because we are putting an additional strain on that tooth, increasing its functions, and food may lodge down in there, and we must be careful about that, too.

I feel like saying something in regard to packing and condensing of amalgam, which is of such importance to me. Amal-

gam is a plastic substance, and it is a substance on which we cannot rely as we can upon gold foil.

We should seek to overcome the bulk changes which occur in most amalgams; there should be constant progress along this line; and there should be particular attention given to condensing and manipulation, the same as in gold foil work.

DENTAL LEGISLATION.*

BY W. T. HARDY, D. D. S., MILWAUKEE, WIS.

SECRETARY OF THE WISCONSIN STATE BOARD OF DENTAL EXAMINERS.

Mr. President, Members of the Wisconsin State Dental Society,
Ladies and Gentlemen:

In presenting this paper on dental legislation, my wish is that it will prompt a full discussion of the subject and will be productive of the members showing more interest and in the society taking the matter more seriously. If it is successful in this the writer will feel that the paper has done some good.

THE WISCONSIN LAW COMPARED WITH THAT OF OTHER STATES.

I believe anyone will admit that a bird's-eye view of our law regulating the practice of dentistry in Wisconsin will compare very favorably with any of the other state laws. It is based upon the recommendation of the committee on Uniform laws of the National Association of Dental Examiners and varies from it only in detail. In whatever detail we are behind, I can only say that we have secured the best we could, considering the means we had to secure it, and the opposition with which we have had to contend. Continually changing conditions, however, require constant alertness and systematic revision from time to time, and it is the writer's opinion that this society should have a legislative committee which is compactly situated and which can be depended upon to work with and co-operate with the State Board. In this work, which is undoubtedly of vital interest to us all, keeping the work well in hand, which is necessary for the protection of the public welfare and the good name of the profession. In this way only can we keep our law on a par with other states and up to the demand of

*Read before the Wisconsin State Dental Society, July, 1915.

the ever changing requirements, and insuring the preservation of what we already have.

THE STATE BOARD NEEDS ASSISTANCE IN SECURING LEGISLATION.

For a number of years it has been left more or less to the State Board to look after the legislation, and while no doubt they should of a right be expected to look after such interests, yet the time seems to have come when the board is not strong enough of itself to gain legislation that is necessary when opposition is met with such as we have just passed through.

It is very evident that the members of the legislature are very susceptible to every influence which is brought to bear upon them, so that when a bill is up before them for a hearing, the side which can produce the most "clatter" will usually get the committee report. This being the case, the state society, with their large membership, should take advantage of the fact and, by having an active committee which can depend upon the prompt support of the members when called for, can make all the demonstration necessary to get whatever they want. Too much importance cannot be placed upon the value of letters or telegrams sent by members to their representatives in the senate and assembly at Madison, asking them to vote for or against certain measures.

THE DENTAL BILL NOW BEFORE THE LEGISLATURE.

At the present session of the legislature, a bill approved by the legislative committee of this society was presented by the board, and which, if enacted as drawn, would have given the board power to revoke a license, after a hearing by the board and a review by the circuit court, for gross ignorance or inefficiency, for immoral, dishonorable or unprofessional conduct. (Unprofessional conduct being defined as meaning the employing of what is known as "streeters" or "cappers" to obtain business. The obtaining of any fee by fraud or deceit, wilfully betraying professional secrets, employing any students or unlicensed person to perform operations of any kind upon the human teeth or jaws, for the advertisement of dental business or treatment of devices in which untruthful or impossible statements is made, or for habitual intemperance or gross immorality.)

This section was copied exactly as contained in the laws of New York, Michigan, Ohio and various other states. The opposi-

tion, however, were able to convince the senate committee on education and public welfare that such a measure would confer too much power and authority on the board, with the result that the committee recommended a substitute bill which was a compromise and which materially reduced the effectiveness of the measure.

THE OPPOSITION TO THE LAW.

The opposition consisted of The Modern Dental Ethical Society, their paid attorney and the representatives of the daily newspapers of Milwaukee, who contributed their presence and their columns to help the advertising dentists. Some of you may want to know who composes the Modern Dental Ethical Society. In answer to which I can inform you that it consists of the proprietors and managers of two or three advertising offices in Milwaukee and the operators employed by them, of whom it was natural to expect that they would co-operate with their employers. Probably the total membership does not exceed ten or a dozen. The organization was hurriedly gotten together and incorporated to defeat the passage of the bill known as 182 S. Apparently this was its only purpose.

THE COMPROMISE MEASURE WE WERE COMPELLED TO ACCEPT.

Quite naturally, when so much "bold front and paid talent" presented itself, compared with the small representation of the state society, the committee on education and public welfare, before whom the hearing was being held, became quite impressed with the opposition and the consequence was that the compromise was forced and the bill in its present form requires that any action to revoke or annul a license, except for non-payment of registration fees, must be brought through the district attorney's office and be tried in the circuit court, and provides for an appeal to the supreme court. The penalty for the first two convictions is graduated fines, and only on conviction for third offense can the court revoke a license. While the bill in this form is not entirely objectionable, because of the publicity that would obtain through such a trial in the circuit courts and which would tend toward being a strong regulation and restraining element, yet the writer is of the opinion that inasmuch as the State Board was originally intended to be the dispensing body of dental police power, unless such authority is lodged with them, the law will probably be uninforced and soon forgotten, like

many others. Aside from this objection, the uniformity of state laws is upset and that always has a bearing upon our reciprocity contracts which I shall mention later on, but worse yet, it proved that, in a way at least, a handful of advertising dentists, by the aid of the press, were able to defeat by substitution a bill of merit and which would have been for the greatest good and which was recommended by a board who should be in a position, better than anyone else, to know what was needed. A board that had nothing to gain personally and who were wholly impartial in their recommendation to the legislature. This defeat could have been avoided if the board could have had a more substantial backing from this society.

UNSANITARY CONDITIONS IN DENTAL OFFICES.

Recently the State Barbers' Board was abolished by the legislature. The reasons given were that the sanitary and hygienic conditions prevailing in barber shops had not improved at all since the creation of that board. The sanitary supervision of barber shops is now being lodged with the State Board of Health.

The dental profession can truthfully claim great advancement in asepsis, sanitation and hygiene, and in wonderfully improved office equipment, yet only in an indirect way can the State Dental Board claim any credit for such improvement, because they are not clothed with sufficient police power to enforce cleanliness and healthful conditions in dental offices. While greatly improved aseptic conditions exist in a large percentage of offices, it is also surprising to know how many dirty and unclean offices there are in Wisconsin. There are many offices which probably have never had a sterilizer of any form in them, and very likely the instruments have never been sterilized since they came from the supply house. Such cases are frequently called to the board's attention. Bad cases of infection, through carelessness or dirty instruments, are reported to the board in hopes that steps can be taken to remedy the conditions surrounding the particular office complained of. The board, however, has no power even to investigate, to say nothing of correcting such conditions.

The same legislature, the same committee and the same newspapers that scored the Barber's Board for not performing this police power, when asked for such power by the dental board were quick to say that we were too solicitous of power, and several of the

assembly committee said they thought the board had too much power already.

WHAT THE BOARD MIGHT BE AUTHORIZED TO DO TO REMOVE SUCH
CONDITIONS.

I say that there is no one thing which would go so far toward the protection of the public against dental impostors, unsanitation and deceitful advertising and to give the profession of dentistry a higher standing, than to clothe the dental board with power to investigate when necessary and regulate the offices and habits of the dentists. Such conferred power, even though not enforced, should be a strong influence for improvement.

The State Board, while conducting examinations, cannot be expected to anticipate the level to which a dentist may sink to in his office habits, or in what direction his character will lead him, for the majority of candidates examined by the board are new graduates and who up to that time have been influenced by the guiding hand of their parents and by the dental college which they have attended and would naturally show their best side at the time they are taking their examinations. Once having passed the board and secured their license, however, there is no more restraining influence and they are free to follow the dictates of their nature, whether it be for better or for worse.

It is not my contention that the Board of Dental Examiners should be a board of inspectors, or that they should be expected to make regular visits of offices, or have any jurisdiction except in extreme cases. Neither do I think they should be empowered to make any fixed rules and regulations, but I do think that in extreme cases of rank deception, fraud or deceit, in cases of malpractice or habitual intemperance or where impossible cures and appliances are advertised, where the unsanitary conditions are such as to constitute a menace to the health of the public, that the board should have power to step in and suspend or annul the license of any such offender.

SOME IMPORTANT PROVISIONS OF BILL 182 S.

There are several provisions in bill 182 S. other than the one providing for the revocation of licenses which if the bill passes will be an advance step for higher dental education and are of interest to the members of this society.

As the present dental law reads, the board has no authority to pass upon the value of high school credentials until the applicant has a dental diploma and presents himself for examination. The result is that many young men without satisfactory high school credentials are accepted for enrollment by not overly particular dental colleges outside of Wisconsin, and after spending three years of time and considerable money, find themselves not eligible to take the state board examinations.

Bill 182 S., if enacted into law, will give authority to the board to pass upon such credentials at any time, so that the prospective student, no matter what school he expects to attend, if he presents his credentials and has them approved by the board, is protected and assured that when he completes his dental course he will be qualified to participate in the examinations. So far as the dental college in this state is concerned, they will be required to present to the board for approval the high school credentials of each student before they may enroll such student.

JUNIOR EXAMINATIONS.

Another important provision of the bill is one that grants permission to the board to allow junior dental students to participate in the licensing examination to the extent of certain theory subjects which they have completed; contemplating that the grades made will be carried over and credited them at the time they appear for a license.

The board was advised something over a year ago that they were legally safe in adopting such a procedure without special enactment, but thought it advisable to have it specifically authorized by law.

The advantage claimed for this system is a pedagogical one, namely that the student can clear himself of such major theory subjects as anatomy, physiology, histology, chemistry, bacteriology, and materia medica at a time when he has completed them, so that he will not be obliged to keep up a review of them during his senior year, thus enabling him to devote his full time to infirmary work and to the direct application of the more practical dental subjects.

Although this privileged examination to the juniors was entirely optional and the board charged an extra fee of \$10, there were 45 students in June, 1914, and 45 in June, 1915, who availed themselves of the opportunity.

The extra fee was necessary to compensate the board for the extra work incurred in looking over additional papers, preparing and keeping a card record of the grades made and transferring the grades at the time the student appears for a license. This opportunity has been taken advantage of quite extensively by students from schools outside of the state as well as those from Marquette University.

Michigan, Indiana, Iowa and possibly some few other state boards extend similar privileges to junior students.

REVOCATION OF LICENSES FOR NON-PAYMENT OF REGISTRATION FEES.

Up to the present time the board has at their annual meeting revoked all licenses of persons delinquent in their registration fees for the year ending September 30 prior to such meeting, which is usually held in June. This means that they have had at least eight months after becoming delinquent in which to pay up before their license has been revoked.

Under an opinion given by the attorney-general, a license once revoked places that person in the same position as one who had never had a license, and in order to regain it he must make application to the board, pay the regular fee and subject himself to an examination before he can be re-licensed. This has in several instances proved to be a very drastic punishment for so slight an offense. Bill 182 S. provides that within one year after revocation for non-payment of registration fees a person may become reinstated upon payment of a fine of ten dollars. This change will mean that a person in reality would have one year and eight months to become reinstated, if he cared to do so.

PROVISION FOR BOARD TO EMPLOY AN ATTORNEY

Since the funds of the board have been placed in the state treasury and are paid out by state vouchers under the law which applies to the disbursement of all state offices, the secretary of state has been unable to audit a bill for attorney services for the board. This has at times proved to be a serious handicap as the service which the attorney general's office can furnish is necessarily limited and is inconvenient at best. Bill 182 S provides that in their discretion the board may employ their own attorney.

RECIPROCITY

The Wisconsin board has entered into reciprocity agreements with the following states: Michigan, Ohio, Illinois, Iowa, Minne-

sota, Kansas and Louisiana, in accordance with the Ashville resolution of 1903. These contracts are all alike as are all similar contracts between other states. They all provide that a practitioner who has been in continuous practice for the five years next preceding his application, will, upon request be issued a certificate of facts, under the seal of the board, stating how long he has been licensed, how licensed, whether by examination or upon diploma, what dental societies he is a member of and such information as may seem pertinent. This certificate entitles the recipient to be excused from all theory examinations before the board he expects to pass. It is necessary however, under all reciprocity agreements, that the candidate be subjected to the practical examination, subject, of course, to modification in the discretion of the board.

The making of reciprocity contracts between state dental boards is in nearly every instance governed by the state law and I think all of them provide that the states must have equally high requirements, both as regards preliminary education and as to the dental curriculum requirements.

This explains the lack of contract agreement between some states, because one or the other state presumes that they have a higher standard than the other. This reason however, is not so prevalent as the geographical one, the general tendency being for western states to refuse to make agreements with eastern states, claiming that the trend of removal is nearly always westward and very seldom eastward. Some states, particularly the western coast states, refuse entirely to make reciprocity agreements with any other state. In spite of this lack of contract between some states, there are several boards who are willing to extend under certain circumstances the reciprocity courtesies usually extended between states having contracts. This may be explained by the fact that their law might permit the exercise of discretionary power by the board in individual cases.

Much has been said and much has been written in favor of general reciprocity between states, or the creation of a national board. I do not care to express an opinion at this time regarding a national board, but my experience as a member of the Wisconsin board has taught me that general reciprocity compelling the issuance of licenses without examination and without the discretionary application would not be as desirable as the present

existing condition. The reason for this statement is that there is in the United States such a large floating element of what might be termed undesirable dentists, quacks and itinerants that the percentage of those seeking licenses by reciprocity is about five undesirable to one desirable dentist. The only reason why the percentage spread is not wider is because under present conditions the quacks and itinerants know better than to apply. It is the writer's opinion that a general reciprocity law which held no restrictions would increase the number of advertising dentists materially, would commercialize the profession in a way which we could not anticipate. On the other hand I know of but few instances where the examination imposed upon practitioners having satisfactory recommendations has been such as to amount to any material handicap.

FOUR YEAR DENTAL COURSE.

The National Association of Dental Examiners, the National Association of Dental Faculties, the Dental Faculties Association of American Universities and the National Dental Association, have each recommended that the dental course in colleges be increased from three to four years, commencing not later than the fall of 1917. This will undoubtedly mean the greatest step in advance for higher requirements and higher standards in dentistry that has been taken in many years.

A good many additions to the curriculum are being advocated by different authorities to occupy the additional time which will be created. While it is to be expected that a number of scientific theory subjects will be added to the dental course, it is to be hoped that the practical side of dentistry will not be overlooked. Dentistry of today in its wider and ever enlarging field is becoming so complex that the dental student cannot be expected to develop the direct application and finger skill in the diversified branches in one year of infirmary work. The clearest example of this in my opinion has been the intrusion of the cast gold inlay into dental practice. It has been my experience, and I believe those who have had an equal opportunity to make comparisons will bear me out in the assertion, that the teaching of cavity preparation and the making of cast gold inlays in dental colleges, has been at the expense and sacrifice of ability to properly prepare and insert a gold foil filling. I wish to emphasize

this point more forcibly by saying that the average dental student graduated today does not and cannot prepare a cavity and insert a gold foil filling which will come up to the standard of a few years ago, before the intrusion of the inlay. I believe the same will hold true in prosthetic work, because there is not enough time in one year in the infirmary for the student to develop as he should in the varied branches of prothesis, which will be especially true if he is expected to carry additional scientific branches.

THE BOARD'S FINANCIAL AFFAIRS.

I hope that I may be excused from diverting somewhat from my subject to take up this matter which I believe you are interested in, which has at least an indirect bearing upon the subject of this paper and which I feel has in the past been kept too much in the dark without any reason for doing so.

I would be glad to go into the details of the manner of conducting examinations as practiced by this board if it would be of any special interest to the members of this society. I hope no one will hesitate to ask any questions about anything they have a particular interest in.

The Wisconsin board is financially self-sustaining in as much as it gets no appropriation from the state, notwithstanding the fact that the board is and should be one of the greatest protectors of the public health and welfare of this great commonwealth. The great pity of it all is that the dentists themselves must contribute to the fund to protect the public from themselves. While the state legislature appropriates thousands of dollars each year to protect the various kinds of live stock, forest lands and other natural resources, yet it hesitates and refuses to appropriate any money to protect the health of the men, women and children against the ravages of disease to which mankind is susceptible and of which the oral cavity is the main gateway.

The board has three sources of income, namely, registration fees, examination fees and recommendation fees. All of this money is immediately paid into the state treasury, and is paid out only by voucher, approved first by the secretary of the board and finally audited by the Secretary of State in a manner similar to which all state money is paid out.

For the fiscal year ending October 1, 1914, the board handled approximately \$4,100 with the possibility of its being about the same for 1915. In comparison the Illinois board had appropriated to them and paid out in 1914 the sum of \$14,000 and expect to use \$17,000 in 1915. I only state these figures in comparison to emphasize the fact that the funds of the Wisconsin board are being conserved and as carefully spent as possible.

Out of the funds coming to the board is paid the salary of the Preliminary Examiner. The state law requires that no person can be examined for a license to practice dentistry in Wisconsin who shall not file with the secretary of the board credentials, proving to the satisfaction of the board that he has a general education equivalent to that required for graduation from a high school or academy having a four year course beyond the elementary school. So many forms of high school credentials and diplomas are presented, from such a varied number of high schools, some from outside of Wisconsin and some from outside of the United States that it is necessary that the board have the services of a man especially qualified to pass upon the value of these different credentials.

For this service the State Superintendent of Public Instruction recommended Mr. C. E. Patzer of the Milwaukee Normal School. Too much cannot be said in commendation of the fearless and conscientious manner in which Mr. Patzer is living up to this large responsibility.

A great deal of correspondence and personal visitation has been necessary on his part to verify and authenticate these credentials.

Mr. Patzer has done this work for a good many years at a great sacrifice for the insignificant salary of \$100 a year, until last year when his salary was increased to \$300 by the board and \$200 by the college, which is somewhat more commensurate with the service performed.

For a good many years the board has been paying off an old bill for attorney's services, incurred a number of years ago when the board was in litigation. This debt was totally for litigation. The board now is in far better shape financially than it has ever been before.

PROCEEDINGS OF SOCIETIES.

ILLINOIS STATE DENTAL SOCIETY, FIFTY-FIRST
ANNUAL MEETING HELD AT PEORIA,
MAY 11-14, 1915.

DISCUSSION ON THE PAPER OF DR. NOYES, "THE RELATION OF
ORTHODONTIA TO DENTISTRY."

DR. J. K. CONROY, Belleville:

In a paper read some four years ago entitled "A Symposium on Orthodontia," I took a part. This same condition was brought to our attention in that symposium at the time I read a paper and Dr. Noyes discussed it. Now, the conditions are the opposite.

I want to say that at the outset I fully agree with Dr. Noyes in everything he has said, although I think in some of his remarks he has gone too far. It is a physical impossibility for any dentist to master all, just exactly as it is a physical impossibility for any physician to master all. Fifteen years ago the average practitioner was discouraged from trying anything in an orthodontic line because of the conditions that existed. Such conditions were mainly that the orthodontists knew it all and the general practitioner knew little about this subject. But conditions are changing now.

There is a great field for the young men today to specialize in orthodontia, but the general practitioner of dentistry must of necessity familiarize himself with the technic of orthodontia. He cannot expect to be as proficient, but it is a field he should cultivate. He owes it to the community in which he lives to do so where there may not be sufficiently trained men, where there may not be interurban nor automobile service to take patients to the man who devotes his entire time to the practice of orthodontia. There are innumerable cases that present themselves, such as children from the ages of seven to twelve, who may need but a very slight movement of the teeth. Please do not misconstrue my words here when I speak of placing the arch in position, as a great many are doing, according to Dr. Noyes, by merely

putting some bands on a molar tooth and applying wire and commencing to use a wrench and tightening up the nuts. That method should be discarded, but I will tell you what is a positive fact, that there are some cases in which that is all that is needed, for the simple reason that the movement is so slight that if you hit it haphazard, you will hit it right. If you are not hitting it right, let it alone and let the tooth go back where it was. I hope you will not misconstrue my meaning in this regard.

Three months ago I came in contact with a case, the patient being a young man, nineteen years of age, who had four lower incisors which were badly crowded. The upper arch was in practically a normal condition. A certain dentist had worked a year to get these teeth in alignment. All he had was two bands and a bar fastened to the lower cuspids and he was trying to move the entire jaw with them. Then he took off the bands, and put on the arch and began with the wires, then he moved the four incisors almost out of their sockets. They would not move the cuspids. Instead of getting trouble out of the way first and allowing the teeth to come in line by themselves, he started at the finish instead of at the beginning. The training that is necessary can only be obtained by taking time, exacting years from general practice, and going to some specialist or to some school of orthodontia and taking training there, and then coming back to your office, making up your mind never to fill teeth again if you are going to do any orthodontia work. I must admit I have been attempting to do orthodontia work for the last ten or fifteen years. I have been doing it for two reasons, one of which is, I like it, and the other reason was at the time I commenced I could not afford to discontinue the practice of dentistry.

There is one part of Dr. Noyes' paper to which I must take exception. He stated that medicine is to dentistry what dentistry is to orthodontia. I will correct him by saying that orthodontia is to dentistry what surgery is to general medicine. There are very few physicians today who will attempt to do surgical work, and then after they are through go and take care of some case of typhoid fever, or be called out to see a case of typhoid fever at three o'clock in the morning, and go down to the operating room about eight or nine o'clock to operate. There are conditions existing in the medical fraternity that are just as bad

as they are in the dental profession, but be that as it may, is a man to be allowed to die of an attack of appendicitis when he is seventy-five miles away from a leading surgeon if there is a competent physician in the locality who can perform the operation? On exactly the same theory, is any child because of the lack of funds to pay the fees of a specialist to go without orthodontia treatment? I want to emphasize this, should any child go through life with a hideous mouth when there is a dentist in the immediate locality who, if for no other purpose than charity, should make some attempt to place that mouth in a presentable condition. (Applause.) There is where the need comes in of an orthodontist or a dentist having a knowledge of orthodontia in the smaller cities.

There is another thing to contend with. There is not a city of 18,000 to 30,000 inhabitants but what can support an orthodontist if the dentists in that community will sitck together and help him. I say that from experience in my own locality. Unfortunately the city of Belleville is located too close to the city of St. Louis, but be it said to the credit of several members of the profession in our city they do send their patients to a specialist in St. Louis. I say that to my own discredit perhaps, for I do not accept cases I feel I cannot handle properly.

One word about new appliances. You were all lifted skyward the other evening when you saw on the screen the pictures of new appliances and heard from a man with a reputation of Dr. Robinson the possibilities of placing an arch of the latest type in the mouth properly attached and send the patient home for three months, and having him or her come back with the teeth in proper alignment. Do not forget, gentlemen, the words of Dr. Noyes in talking on that very paper, that some time, where you put on an arch of that kind, and do not know what you are doing and send the patient home for a month, you may have the teeth going wrong for a whole month. There is where a man has to be a specialist. He has to learn the technic. He has to learn tooth movement and know when he places an arch of that kind on the jaws exactly what it is going to do. If you do not know why you are putting on pressure, and where it is being applied, do not do it. In adjusting an arch of that kind, from what I can learn today, one should be able to tell the patient

exactly where he is feeling pressure without asking him where he feels it.

There is another thing Dr. Noyes touched on rather lightly, and that is the differences in individuals, or the difference in density of the alveolar process in different individuals. The difference in the condition of the mucous membrane and the resistance of the tissues, plays a very important factor in orthodontia work. I have seen cases at the age of 16 and 17 where the teeth would seem to move as readily as if the patients were 10 or 11, and I have seen cases at the age of 17 that I have refused to take on account of the density of the alveolar process, and knowing that it would be an endless task to complete a case of that kind.

Now, gentlemen, I have gone over this paper as thoroughly as I could, not having seen it until a few days ago; but I want you to take to heart everything that Dr. Noyes has said, and I for one voice everything he has said with the few objections I have mentioned. I thank you.

DR. ARTHUR SMITH, Peoria:

I never attended a dental meeting in my life when I kept still so long. I felt that if I did not say something on this subject at this time I would blow up like a fifty dollar automobile tire, because there are so many things accumulating in my system that I want to say.

Things are crowding us so rapidly these days that it is very hard to keep up with the times. I do not know very much about the Bible, but I know in that good book it says, "Seek ye first the Kingdom of God and his righteousness and all these things shall be added unto you." That may sound as if it does not have anything to do with orthodontia, but it has. It says seek you the Kingdom of God and His righteousness, and what we fellows are trying to do as specialists or as orthodontists is to do the thing right, trying to find out what the law is, and having found out what it is we are trying to keep it. When some fellow in the community has found out what the law is with regard to regulating teeth, he must keep that law for that community, and why do men send patients to this or that man? To seek the Kingdom of God and His righteousness. There is no mystery about this thing. It is perfectly simple. If we fellows in our

business seek first the Kingdom of God and His righteousness, the material things which we group under the big word "income" will be added unto us, and not added onto the other fellow, and don't you forget it. It means more business. It is a business principle because I have tried it out. The more business you send away, the more business you will have. Business is like happiness, and happiness is business if it is the right kind of business. The only way on earth to have a good time is by passing it around, and then you will have more love for yourself. And it is the same way with business.

When Dr. Welty came to Peoria, I quit orthodontia because I recognized I was not up to the mark. I send all my patients to him, and I am man enough to stand before you and freely admit my inability to treat cases of orthodontia successfully.

A man came to me and said, "Do you think my boy's teeth need regulating?" I replied, "That I not only thought so, but I knew it." I said to him, "I cannot straighten them, but I can tell you who can straighten them and if you have no objection, I would suggest that you send the boy to Dr. So-and-So."

He said, "Well, I don't know about that. My friend Bill Jones sent his children to a certain dentist to have their teeth straightened and in the course of a short time they all went back, and I know of other people who sent their children to dentists to have their teeth regulated or straightened and they all went back." I said to him, "You run a bank, don't you?" "Yes." "And you consider it a mighty good bank?" "Yes." I said, "I heard of a man once who put his money in a bank and lost it. That man was foolish. He ought to have put his money in a place where it would be secure. If I came to you and told you as a banker that thousands of well intentioned people had put their money in banks and lost it through the rascality of miserable soulless men, and that they ought to have sought a better place to put their money than in a bank, you would not think it worth while to waste much time in talking to me, would you? I am going you one better. When you tell me about those people who have sent their children to a certain dentist or dentists to have their teeth regulated and got nothing for it, I am wasting time in trying to convince you that you are wrong." The man replied, "I never thought of it in that way." I said, "It is high

time you began to see it in that way. I am sending you to a man who will do the work just as a fellow puts his money in your bank. I know his money will be cared for, and I know that the teeth of your boy will be cared for."

Gentlemen, my heart is full of these things. Take off the lids, get out of the way, and give the next fellow a chance. (Applause.)

DR. EDMUND NOYES, Chicago:

I shall not spend any time in playing the proud father act, but I will say this, that I hope and believe that some twenty years from now this paper which has been read this morning will be quoted and referred to as one of the early things which pointed the way of the profession. It has indicated to you the way in which the profession must be developed if we would fulfill our destiny. The medical profession has shown us how. We have only to follow their ideas and principles and precedents. The medical profession showed us how to organize their profession in societies and we followed their plan essentially and got the great state organization we have now. We must have in the future some good opportunity for training specialists as they should be trained. It is true enough, that we must train men in the dental schools so that they can go into small communities and do everything in dentistry that is needed to be done. Medical schools must train men in medicine so that they can go into the small communities and do everything that is needed to be done—surgery, eye work, ear work, gynecology and everything, in the cases where it must be done and where better service cannot be rendered. That does not relate in a very important way to the development of specialists, but it does indicate the sort of foundation education which must be given both to medical men and to dentists.

Some concern has been expressed once or twice about the assertion some medical men made a good while ago that the dental degree was the badge of a partial culture or a partial education. Gentlemen, the time has gone by a long while when such an accusation can possibly be considered a reproach. Two or three hundred years ago it was supposed possible for a man to acquaint himself with the entire accumulation of literature and science extant in the world, but today we know that a man can-

not acquire all that is known of knowledge and skill in his own profession. All culture is partial, and all education is partial. The thing that we must do is to pick and choose and give to our men a good foundation of the things that must be underneath the superstructure they wish to build, and then build the superstructure that they want. (Applause.)

DR. NOYES (closing the discussion) :

I want to offer an apology first to Dr. Conroy. Dr. Conroy never saw what there was in this paper until he got to Peoria. In the next place, I want to offer an apology to the society for presenting it.

Last September I began getting material together for a careful and rather analytical presentation of the new appliances in orthodontia with the idea of contrasting the plans of procedure and more especially of presenting, not the utopian beauty, but the difficulties of these appliances, and especially of the things in orthodontia which can well be done by general practitioners and the aid these new appliances would be in doing these things. I had arranged and assorted out my cases for two years, and had gotten my material together, and it was all laid out six weeks ago to present to this meeting in detail, but at the last minute I was obliged to turn the corner and use an introduction for the entire paper. So I feel that I owe an apology both to the society and to Dr. Conroy.

With regard to the discussion, I have nothing to add except to say that I think the discussion has simply enlarged the paper.

DISCUSSION OF THE PAPER OF DR. CONVERSE ON "THE THERAPEUTIC
VALUE OF EMETIN HYDROCHLORID IN THE TREATMENT OF
PYORRHEA ALVEOLARIS."

DR. J. P. LUTHRINGER, Peoria :

In contemplating the title of this paper we are confronted with the fact that the subject matter was presented to the profession so recently as last July, allowing a lapse of time scarcely sufficient to permit of intelligent conclusions either favorable or unfavorable.

The discoveries given out by Drs. Barrett and Smith have resulted in the scattering broadcast of much misinformation, both to the profession and the laity, which is indeed deplorable in

that false hopes have been aroused both as to ease of administration and sureness of results. Manufacturing chemists evidently follow dental literature so closely as to put the members to shame if one may judge by the distressing promptness with which they have risen to the occasion by supplying the remedy in such facile forms that every afflicted person can be his own dentist in this connection. Many a one has grasped the seeming opportunity—and, like the lawyer who tries his own case—has a fool for a client.

The upshot of all this is a train of disappointments, ridicule, condemnation and confusion out of all proportion to the original claims of Drs. Barrett and Smith.

While not wishing to find fault with these men for the really meritorious work they have done we cannot help feeling that, aside from merely calling attention of the profession in a general way to the work they had in hand, it were better had they conducted their clinical experiments to a final definite conclusion before taking the profession at large into their confidence relative to the *modus operandi* in combating pyorrhea alveolaris. The profession as a whole is not a good field in which to work out scientific matters. We are better equipped to take up and apply the end results than we are by training to blaze the way in working out the devious ways of scientific discovery. As stated above, we are speaking of the profession as a whole.

Had the full information been placed in the hands of fifty or one hundred really capably equipped men in the profession the results would have been more surely and definitely worked out in due time.

The part played by the endameba in the etiology of pyorrhea is not clear at present—neither has it been proved that this protozoon is pathogenic in this connection—yet the clinical tests and observations of Drs. Barrett and Smith and Drs. Bass and Johns in the use of emetin can leave no doubt that it is of value in the treatment of pyorrhea. I say of value—I mean just that—an aid, not a specific. All dentists know enough about pyorrhea to know that medication alone will not cure the disease. I believe that emetin is the second fifty of the fifty-five combination required in the management of the curable cases of the disease. I would give first place to the removal of the exciting.

irritating causes. I think this is the most important step, whether these exciting causes be calcareous or serumal deposits, lack of contact points, irritating edges of crowns and fillings or mal-occlusion. I cannot refrain from finding some fault in that sufficient stress has not been laid on this important part of the procedure, but it is bound to come.

I believe the operator who convinces himself that his part in the work is as difficult and irksome as it always has been; who will use judgment in selecting curable cases; who will extract all hopelessly loose teeth; who will reduce all exciting causes due to former dental operations, and who will carefully and painstakingly remove the deposits from the roots and the other surfaces of the teeth, and who in general will employ the local measures he has heretofore, with the co-operation of the patient, will find in the use of emetin the one thing lacking heretofore. I believe it will finally crystallize into a fifty-fifty procedure—with emetin as the lesser half, but of undoubted value.

DR. E. F. EVANS, Decatur:

Mr. President and members of The Illinois State Dental Society:

I wish to compliment the essayist upon giving us such a splendid resumé upon this topic which perhaps is uppermost in the minds of the members of our profession, and is receiving so much attention from the medical profession as well as the laity.

And since there is such an interest in it, and the members of our profession have been so ready to try this remedy for which so much has been claimed, we should certainly give this subject a full consideration at this time, that we may be fully informed as to its merits and what we can expect of it.

If emetin hydrochlorid is a specific for pyorrhea alveolaris then we should all be acquainted with it, and if it has no merit we should be informed so that we may avoid it. The only thing the majority of us will be able to contribute in this discussion will be from the clinical aspect and report our observations.

In the conclusion of his paper the essayist says that emetin has a beneficial effect in some cases of pyorrhea. That expresses, as nearly as I can do it, my experience with it. I have used it both locally, by injecting it into the pockets, and also

internally, using the "alcresta ipecac" tablets. More recently I have been using these tablets and applying iodine locally. My experience with the tablets has not been the same as the essayist's. As only two out of twelve patients to whom I have given them have reported any diarrhea, and two others reported that it was a mild laxative. In these cases where diarrhea occurred we discontinued the treatment until they were normal again and then administered but one tablet at a time instead of two.

In seven out of eleven cases the pus disappeared and the mouth apparently is in a healthy condition. Three of the eleven cases had very deep pockets, and while in every case the flow of pus was diminished it was not eradicated, and so long as the deep pockets are there I suspect the trouble will continue by reinfection or otherwise.

One case on which the emetin had no apparent effect was one in which we failed to find any of the *endameba buccalis* when we made a microscopic examination, which we did several times. Which leads us to believe that all cases that we diagnose as pyorrhea are not of the same origin.

From clinical observation I am convinced that some cases of pyorrhea have been cured by systematic treatment other than that under discussion, one such case I would like to report. A patient about eighteen months ago lost one of the lower lateral incisors from pyorrhea and the other incisors were very loose so there was no hope of saving them. He came to me again a short time ago to ask about the emetin treatment, and to learn if it would benefit his case. I told him, before examining his mouth, that nothing would save those lower incisors but that it might do some good for the others. I made an appointment with him to come and begin the treatment. He had been sick, since I saw him eighteen months ago, and you can imagine my surprise when I examined his mouth to find that he had no pyorrhea at all. The lower incisors were still loose from the loss of the alveoli, but there was no pus so far as I could discover. The systematic treatment he had received during his illness had cured the pyorrhea.

Our essayist has rightly said that the laity is aroused over this subject, and those who have pyorrhea, or think they have,

are demanding that we do something for it. If emetin hydrochlorid will cure even a part of these cases let us use it and hope that we shall not have long to wait until we have something that will cure the others.

DR. E. F. HAZELL, Springfield:

From what I can see and hear, everyone who has spoken has given some kind of rap at the treatment of pyorrhea alveolaris by emetin hydrochlorid.

A few days ago in conversation with a returned missionary from the Philippines, the subject of vegetables was mentioned, and he informed me that they ate no uncooked vegetables in the Islands. My curiosity was aroused, and I questioned him why they ate no uncooked vegetables, and he said they were fearful of the conditions which prevailed with reference to the fertilizer used, and more especially the ameba. I said to him, you doubtless recognize that there has been a treatment used for the removal of ameba, namely, emetin hydrochlorid. He replied, "Yes, emetin is being used, but among several of my personal friends the treatment has been almost worse than the disease. That was for the treatment of amebic dysentery."

In my own practice I have used the treatment in various ways. I have not used it as an internal treatment, but I have used it as local treatment in pus pockets and by giving it subcutaneously. Several cases have exhibited very sore arms. The technic of the injection was followed very religiously, all precautions being taken to prevent any infection, yet a sore condition of the arm was present. One patient complained seriously of systemic effects, such as a general malaise. In fact, she expressed it in this wise: "I have an all gone feeling." In each case the tissues seemed to look better. In certain parts of the month the pus abated in its flow while in certain others it did not. Most of the patients treated reported a bitter taste in the mouth. Apparently good results have been obtained by me by use of the iodo-glycerole as compounded in Dr. Talbot's formula, although I must give some credit for results to the use of emetin.

DR. ARTHUR D. BLACK, Chicago:

I want to make one suggestion relative to the consideration of this and all other methods which may be suggested or employed in the management of these cases of pyorrhea alveolaris,

and that is that we need possibly more than anything else to make a more careful study of the histology and the possibilities of repair in the tissues with which we are concerned; that we need, above all things, to recognize the fact that in the cementum we have a tissue which is different from any other tissue in the body; that we have there a tissue which is closely analogous to bone except for the fact that it has no blood supply; that we have a tissue which as compared with bone, is not able to throw off the dead portion. When we have a stripping of the periosteum from bone we have a necrosis of the outer plate of bone, and as a result of the activities of the cells deeper in the bone, supported by its circulation, we have the throwing off of that dead bone. When the periodontal membrane is stripped from the cementum by a suppurative process, the cementum dies, but there is no circulation within the cementum which makes it possible for the dead portion to be exfoliated, and it remains as a continuous irritant.

I wish to emphasize the fact that the basic principle for all treatment and for all prognosis must be in a study of the tissues themselves and the changes which occur in them, rather than of the things we apply to them. (Applause.)

DISCUSSION ON THE PAPER OF DR. OTRICH.

DR. LOUIS SCHULTZ, Chicago:

In opening the discussion on Dr. Otrich's paper I shall waste no time in preliminaries, but get right down to facts.

Dr. Otrich laid stress on the maxillary sinus as being the structure involved most frequently both in the domain of the dentist as well as that of the rhinologist. If we wish to take the figures he has given us, and take it for granted that ninety per cent or more of the diseases of the maxillary sinus are due to diseases of the teeth, I would say that the treatment of the diseases of the maxillary sinus belongs to the dentist exclusively and not to the rhinologist; however, statistics will not bear out that high percentage. I think the percentage of dental lesions which cause diseases of the maxillary sinus is somewhat lower than that given by the essayist. I should say in chronic suppuration of the maxillary sinus we may look for a percentage up to eighty or eighty-five. In acute suppurative conditions we may expect a percentage of seventy to eighty.

The pathology of the teeth which causes this disturbance in the sinus is important. Putrescent pulps causing alveolar abscesses which break into the sinus or putrescent pulps in teeth the roots of which penetrate into the sinus and cause direct infection of that cavity probably furnish the most frequent etiological factor. Malposed teeth erupting into the sinus may cause the same condition, acting as an irritant in the sinus, a hematogenous infection occurs, and we have a chronic suppurative maxillary sinusitis unless the trouble is relieved at once.

There are other conditions which may cause diseases of the maxillary sinus which are non-suppurative, and yet largely due to the teeth. I refer to cysts. We may have cysts invading the sinus, among which we have the ordinary infective cysts which by absorption of the wall of the sinus get into that cavity after the wall has been broken through. Then, we may have cysts which are non-suppurative in their origin, cysts from tooth germs which may get into the sinus and sometimes completely fill that cavity. So much for the large number of causative dental factors in the diseases of the maxillary sinus.

We have from twenty to thirty per cent of maxillary sinus diseased conditions in which the teeth are not responsible, and those conditions properly come within the domain of the rhinologist. First and most important among these diseases we have the acute rhinitis or coryza; the ordinary cold. When a severe coryza affects an individual, you will all agree with me that that individual does not feel at all well, and that among the symptoms he has is a marked frontal headache. You probably have all had that experience. This frontal headache is due to an inflammation of the frontal sinus, and we have in practically every case, where there is an inflammation of the frontal sinus, also an inflammation of the maxillary sinus by continuity of tissue. They are both lined with mucous membrane continuous with that of the nose and so are frequently involved during a coryza. Now, if in cases of ordinary cold more attention would be paid to the accessory sinuses of the nose, I believe a great deal of trouble could be avoided which frequently manifests itself later on in the sinuses and which originated from the rhinitis.

Next in order of importance are nasal deformities, such as a deflected septum obstructing the normal passage in the region

of the ostium maxillare. Any condition which causes swelling of the mucosa, and this usually means an infection, may cause infection of the maxillary sinus, by extension. Enlarged turbinates will do the same thing.

Then there is that large class of acute infectious diseases which may begin with respiratory symptoms, due to pathological changes in the nasal passages, and among these are scarlet fever, influenza, etc., and influenza I should put first, because the bacillus of influenza, if it finds a suitable habitat is one of those germs which are very prone to cause a great deal of mischief. Having its origin in the nose it may cause a purulent infection of the maxillary sinus, and may travel all over the body setting up similar conditions in widely separated areas. Typhoid fever, pneumonia, measles and the like may also cause a maxillary sinusitis, though perhaps not as frequently as the former. Then we must consider traumatic injuries, as a compound fracture or a comminuted fracture which involves the maxillary sinus, which will always give rise to a suppurative condition of that sinus. I cannot leave the subject of maxillary sinus diseases without saying a word or two about malposed teeth erupting into the sinus.

A woman came to my dispensary service some time ago, who presented an ulcer in the floor of the nose. She was turned over to the students for examination, diagnosis, etc. They made a diagnosis of syphilis of the nose. On casual examination the ulcer did look as if it might be of a syphilitic nature, but on wiping away the detritus I found that there was the crown of a cuspid tooth exposed in the floor of the nose, and by means of a nasal forceps, which is a weak instrument as compared with forceps used for extracting teeth, I was able to remove that tooth. It lay fairly loose in the floor of the nose. It was trying to erupt into the nose.

In regard to Dr. Otrich's first case history, I would like to ask him to tell us in closing just what was the cause of the suppuration in that sinus. So far as I am able to determine, the cause is not clear. Was there any connection shown between the second or third molar and the sinus? The history censures the dentist who extracted the third molar and was treating the second molar. I would like to know about the subsequent his-

tory of the second molar. I speak of this with some feeling, because I had a similar case in my own practice. I attended to an upper second right molar; I filled the root canals, put in an inlay and dismissed the patient. Several weeks later she came back with all the symptoms of an acute maxillary sinusitis, telling me she caught cold and that she had a profuse discharge from that side of the nose, accompanied by pain and swelling. Teeth related to sinus were tender to pressure and the tooth in which I put the inlay was the sorest of them all. The inference was that that tooth was the cause of the trouble. I punctured the wall of the sinus and washed it out, once a day for four days; by that time the symptoms had disappeared and there was no more pus. She has remained well since.

I cite this case to show that in nearly every case where a dentist treats a tooth on the side of the maxillary sinus, the question arises: Is that tooth the cause of the maxillary sinusitis? In this woman's case the maxillary sinusitis was due to a so-called cold.

I would like to know also from Dr. Otrich why transillumination was negative in case No. 2. Was it negative because the bones of the face were so dense that they prevented the penetration of the rays of light or was it negative because no shadow appeared on the affected side?

As to Waldeyer's ring, I do not know how many of you ever heard of it before, but it is there. Waldeyer's ring is simply a collection of lymphoid tissue in the upper respiratory tract as described, which differs somewhat from the other lymphatic glands. The difference lies in the fact that these lymphatics have no afferent vessels, while they are possessed of efferent vessels. There are no lymphatic vessels leading to them, but lymphatic vessels do lead from them. So far as Waldeyer's ring itself is concerned, I do not believe that it has any defensive qualities. If any are present, they are almost negligible. The fact is that the structures concerned with that inner ring or the ring of first defense are causing a good deal of mischief in the human family. When we think of people with hypertrophied tonsils causing as much trouble as the teeth are charged with, and when we think of the baneful results from adenoids because of their effect upon the hearing of a patient, and because of their

effect upon the mentality of children, to say nothing of their pernicious effect in obstructing respiration we can hardly speak of these structures as being defensive in character. If anything, they are offensive. I do not wish to imply that these structures are offensive throughout the entire life cycle of the individual. They are not often so at birth, and I believe they do serve a function, but what that function is, I do not know. Nobody else knows. But we believe that at birth and perhaps during the first year of life these structures probably serve a very important function in bringing the individual's immunity to disease to par. However when they become taxed with germs time after time, and when these germs overpower their resistance, and prevent the normal function of these tissues so that they become enlarged and diseased and become a menace, we can hardly speak of them as being defensive.

As to the deep chain of lymphatics there is no doubt but what that ring is defensive in character. We know that in certain diseases of the teeth, as putrescent pulps, we very often find enlargement of the deep cervical lymphatic chain. We also know that when we have diseases of the tonsils we have the deep lymphatic chain involved. Especially is that true of the lymphatic gland situated high in the deep cervical chain, the so-called tonsillar gland—I mean by that the tonsillar lymphatic gland, the uppermost gland in the deep cervical chain.

This chain is prone to become enlarged as a result of the drainage of toxins from the tonsils, or from the teeth for that matter, and these toxins do not necessarily come from pus organisms either; and when enlarged and their resistance lowered, along comes a germ which would ordinarily be thrown off without effort, but which now gains a foothold and frequently that germ is the bacillus tuberculosis and the child has a tubercular lymphadenitis. Up to a short time ago beautiful operations were performed on those tubercular cervical lymphatic glands. An S-shape incision was made in the neck, and the entire chain of glands removed. The thing looked very nice for about six months, but the child had a recurrence and the same operation was repeated. Today that sort of operation is obsolete, instead the tonsils and teeth are looked after and the focus of infection is removed, so that the glands may regain their normal contour

and in most cases they do go down if they are enlarged. All the structures which make up Waldeyer's ring, especially the faucial tonsils and the pharyngeal tonsil, are structures of the utmost importance in children because of a number of conditions in which we are directly interested. First of all, they cause mouth breathing. Mouth breathing is caused by obstruction of the respiratory passages, whether in the nose or throat and if the respiratory passages are obstructed, the child will have a deficiency of air and oxygen. It breathes through the mouth because it cannot get air enough through the nose. It cannot breathe through the nose freely and does not get the proper amount of oxygen. The air which gets into the lungs does not contain the amount of moisture that it would contain were it passed through the nose before it reaches the lungs, and so as a condition resulting from this we have anemia present in these children.

Another condition we have is what is known as pigeon-breast developed in these children, which is of importance from the standpoint of general health. Mouth breathing is of further importance to us as dentists because, as a rule, we have irregular teeth in those individuals, though not always. The teeth are dry because of the air that is passed over them constantly as the child is breathing. These irregular and dry teeth furnish the greatest cause for early decay that I know of. The effect on the dental arch is marked. The vault is saddle-shaped. It is high, no doubt you have all observed these cases. If these conditions are allowed to go on and the nasal obstruction is not removed early in life, permanent impairment of these structures will result. The high vault and saddle-shaped arch will remain if the pathological condition has gone on for a sufficient length of time. In other words, when these conditions are present they call for early removal, and the sooner they are removed the better it is for the child.

There are other conditions besides enlarged tonsils and adenoids which may cause mouth breathing, and among these are synechiae or adhesions in the nose, between the turbinates and septum. We have enlarged turbinates, a condition known as hypertrophic rhinitis. There are different forms of the latter condition, and there are quite a number of them. Atrophic

rhinitis will cause it, and you wonder why atrophic rhinitis will cause it. It implies a shrinkage. The chambers are abnormally large and the air in passing through will cause the formation of crusts, and these crusts if left alone may fill the entire nasal chambers. Purulent rhinitis, tumors, foreign bodies, are all to be included under conditions which may cause mouth breathing.

I was very glad the other night to hear Dr. Robinson tell us that adenoids should be removed in cases of orthodontia. He made a significant statement when he said that adenoids should be removed and removed repeatedly if necessary because of the fact that when you do remove adenoids, no matter how skillfully it may be done, nor how radically, they may sometimes recur. It is not so with the faucial tonsil, but it is a fact in connection with adenoids.

It is important for us as dentists to recognize adenoids when present and we can do that without asking either parent or child any questions. You can recognize adenoids as soon as a child comes into your office without anything having been said about nasal respiration or anything of the sort. How do you do it? The first thing you cannot help but see is the fact that the child is a mouth breather. The next thing you observe is that his teeth are irregular, and then there are a number of other things that will attract your attention and proclaim the presence of adenoids. For instance, the child will have a far-away expression in the eyes if adenoids are at all pronounced and his health is affected by it. The alae of the nose are compressed due to lack of function. They are not developed. The nasolabial fold is usually wanting for the same reason, and if you wish to go farther, make a digital examination of his nasopharynx. By questioning the child you will probably find that he does not do very well in school. The hearing is impaired, and sometimes the child may be charged with disobedience, when as a matter of fact he cannot hear when spoken to. His mentality may be below par because he does not hear.

So far as the examination of school children is concerned, I do not believe that any dentist in examining school children in Chicago would feel called upon to make a report on adenoids, because there are men who are specialists in this line of work and who examine children for that purpose. If on the examining

board there are no men to do this, I think it would be permissible for dentists to make the statement that the child had adenoids, although the public would expect that from the general practitioner of medicine rather than from the dentist.

So far as reflex pains are concerned, we can easily see from the distribution of the fifth nerve and from its connection with other important nerves, that we may have referred pains in other parts of the body and some quite remote from the offending part. For instance, we may have a loss of taste and sensation on the side of the tongue from the existence of an abscess in the ear, the connection being by way of the tympanic nerve. A tonsil pressing on the glosso-pharyngeal nerve may cause pain under the tongue, in the alveolar process and along the side of the neck. Irritation in the nose, such as spurs, may cause pain in the teeth from the innervation.

So far as impacted lower third molars are concerned, you are all familiar with the disturbances they may cause. You may get pain which is not recognized in the tooth itself, and yet which is caused by the tooth. A patient may complain of a typical *tic douloureux* caused by an impacted lower third molar. Pain may be referred to the eyes, ears, neck, tongue, arms and so on. A peritonsillar abscess and an impacted lower third molar may be so similar that one condition may be confused with the other.

Lastly, I would refer to the pathological conditions caused in the nose by cleft palate. The irritations which cause hypertrophy in the nose, infection, discharge, and enlarged lymphatic tissues, especially adenoids, are all of especial importance, but I haven't the time to go into that as I have occupied more time than I should have and so I close my remarks by thanking you for your attention.

DR. WM. H. G. LOGAN, Chicago:

The essayist's observation that antrum infections are frequently the result of the infection spreading by continuity from teeth is an accepted finding by both the dental and medical professions; however, the thought that peridental infections are to be held accountable for over 90% of all such infections is a conclusion I have not seen recorded before, as most authors have placed this percentage much lower. Yet the frequency with which chronic apical infections have been proven to be the initial

etiological factor in antrum infections has caused me to make it my rule to test all teeth for pulp vitality in that maxilla and to have radiograms taken of those not having vital pulps. If this plan is adhered to, the frequency of the error made, by opening into the antrum, via the nasal fossa or from the mouth through the tissues about the root ends and leaving the initial infected area in the alveolar process to reinfect the antrum may be avoided, as a rule. I say as a rule, because the X-ray will not always outline an infected tract from the root end to the antrum if it is very small, even though it be present. To test the vitality of teeth quickly and accurately, I prefer the faradic current in its application as suggested by Prinz.

The point brought out that one cannot always tell positively whether the antrum is infected without a preliminary opening for irrigation is correct and should always be kept in mind to avoid stating that a suspected antrum is healthy when all other methods have been employed to determine whether it is free from infection, except irrigation.

The opening for irrigation for diagnostic purposes can be made within the mouth above the teeth on the buccal if they are in position, and the irrigating fluid carried into the antrum while the patient's head is held forward and slightly to the opposite side—thus carrying the contents of the antrum out of the nostril into an examining basin. Or, we may make our opening with possibly less discomfort to the patient, by carrying the antrum needle into the inferior meatus and passing it back one inch from the anterior border of the inferior turbinate—the point of the needle directed up and in where the turbinate body joins the nasal surface of the antrum wall. Since the intervening bone is very thin at this location a penetration is easily made.

With the needle supposedly in the antrum, air should be passed through it to determine our field. If we have missed the antrum we would expect to be anterior and the air will be carried into the soft tissues over the facial surface and their distention will result. On the other hand, if we are in the antrum, the air as a rule will be noticed carrying fluid from the natural opening—but this will not always be the case. After determining that the needle is not misplaced, water is substituted for the air which is first carried in carefully under a small amount of

pressure until its escape through the natural opening is positively made out. The precaution of carrying the water into the antrum without pressure until the normal opening allows for its exit must always be kept in mind, regardless of whether the opening is nasal or oral. These diagnostic openings for irrigation can be made with little discomfort to the patient and whenever a question exists in the operator's mind as to the correctness of his findings, these preliminary steps should be taken.

As an example of the possible ill effects that may arise from chronic focal infections about teeth, I desire to report the case of a physician who presented with a definite serous iritis. After many consultations with internists and specialists, they reached the conclusion that the iritis was due to the effects of some chronic infection. But all suspected areas were found to be normal except the four lower incisors about which a pus discharge was seen. These pyorrhea teeth were condemned and immediately extracted without treatment, but no improvement was noticed in the eye lesion with the destruction of the only known area of infection.

Then the patient came to Chicago to consult further medical aid. He was pronounced free from infection by his eye, ear, nose and throat specialists.

Upon taking a blood examination on October 23, 1914, I found the hemoglobin to be 70%, red cells per cu. mm. 4,440,000 and white cells per cu. mm. 10,400. The differential count showed polymorphonuclears 72%, large mononuclears 1%, small mononuclears 25% and eosinophile 2%. The blood pressure was—systolic 130, diastolic 100, pulse pressure 30.

Since this blood picture was common to those found where chronic infections exist about root ends without sinuses, and was not a picture associated with pyorrhea to the degree the lower incisors were involved, I suspected the presence of an infected bone cavity about the root ends of his teeth. The X-ray revealed a small bone cavity about the apical third of the left upper cuspid root which has been used as an abutement for a bridge, and about the right lower second bicuspid. It was decided to have the bridge removed and under proper precautions to prevent bacterial contamination the teeth were positively dried, crowns and exposed root surfaces painted with tincture

of iodine and the area protected with sterile gauze. The teeth were extracted, the root ends amputated with a sterile saw, placed in sterile bottles and sent to the Columbus Laboratories for aerobic and anaerobic tests for the presence of bacteria. The findings are here appended.

Upper tooth—Aerobic;

Streptococci—present (*Streptococcus pyogenes*.)

Staphylococci—present (*Staphylococcus pyogenes aureus*.)

Saprophytic bacilli—present.

Anaerobic;

Pus cocci—present.

Proteus bacillus—present.

Lower tooth (dry tooth)

Aerobic;

Staphylococci—present. (*Staphylococcus pyogenes aureus*.)

Saprophytic bacilli—present.

Anaerobic:

Very few cocci grew.

Following the extraction the infected bone cavities were curetted on October 24th, 1914. On October 29th a second blood analysis showed:

Hemoglobin 88%

Red cells per cu. mm.....4,704,000

White cells per cu. mm..... 8,200

Differential count.

Polymorphonuclears63%

Large mononuclears 7%

Small mononuclears30%

Eosinophiles 0

On November 4th, 1914, eleven days after the extraction and bone curettement of the infected area we find the following normal blood condition:

Hemoglobin 93%

Red cells per cu. mm.....4,732,000

White cells per cu. mm..... 7,600

Differential count.

Polymorphonuclears64%

Large mononuclears	6%
Small mononuclears	29%
Eosinophiles	1%

On November 3rd, 1914, his vision was reported normal by the specialist having his eye in charge.

The reason this case is presented in detail is to again call the attention of the profession to the serious unusual results that may come from leaving small infected areas in the alveolar process even though the patient is not cognizant of their presence. The investigations made by Hunter in 1900, Kenneth Goadby in 1911, Billings, Davis, Nicol, Rosenow and Liebman in 1912 and Hartzell in 1914 present scientific evidence of such a conclusive nature that the dental profession must cease leaving teeth in the mouth about which there is a chronic infection. Let this not be misconstrued to mean all such teeth should be extracted. I speak of this because I am aware that in many communities there are a few men who maintain every tooth should be removed about which is found a chronic infection while on the other hand we find dentists who wish to retain practically all of these dental organs.

The sane position to take, as I see it, is—it is for the medical profession to maintain all such teeth should be extracted. For as a *body* they have not been trained sufficiently in dental pathology to know when a chronic periodontal infection is extensive enough to demand extraction. Therefore, the dental profession can rightfully ask the courtesy of the medical profession that all such patients be referred to the family dentist who will, alone, or in consultation with those particularly fitted in this work, diagnose whether the teeth can be retained and the chronic infection about them controlled. In a general way this courtesy has not been extended to the family dentist, for I have been frequently informed during the past few years by dentists that their patients have been taken to hospitals and many teeth extracted which could and should have been retained throughout the life of the patient. My point is, the medical specialist should extend to the dental practitioner the same courtesy he has extended in the past to the general practitioner of medicine. Yet some medical specialists have informed me they are not justified in sending the patient to the family dentist because he will not assist in demanding

the extraction of all such teeth. This is true to a degree, for we have many members of our profession who day after day are retaining teeth for bridge abutments about which incurable chronic infections exist. All such teeth should be extracted and the diseased area around them properly treated. Hopelessly diseased pyorrhea teeth are sometimes retained because they can be made comfortable, root ends are being amputated without regard to the surrounding bone involvement—to the end that in both instances the infection is only temporarily controlled and the injurious effect to the patient allowed to continue.

As I see it the dental profession must adopt this axiom—All teeth involved with pyorrhea or having chronic infection about root ends which cannot be controlled must be extracted—or we stand convicted before the medical profession and public as being unable or unwilling to properly care for the health of our patients, in accordance with the findings of our most scientific investigators.

DR. GEO. J. DENNIS, Chicago:

The recognition in recent years by the medical and dental professions, especially by the physicians, of the intimate relationship between the pathological changes occurring in the mouth, and those found elsewhere in the body, is one of the most important features connected with the presentation of this paper.

Fifteen years ago, and even later, the trend of dentistry seemed to be toward the perfection of mechanical appliances, in connection with the teeth alone, but within the last few years there seems to have been a broadening of the vision on the part of the dental profession. They are taking their place in the investigative field with a deep insight into the conditions affecting the teeth, and are associating with these investigations a wide consideration of the relation of these conditions in the body as a whole. On the other hand, the physician has awakened very recently to the fact that alliance must become closer between the dentist and physician if he would arrive at the cause of many of the indefinite and obscure complaints of his patients.

Dr. Otrich has divided his subject into three headings:

1. Those diseases of the mouth that extend by continuity.
2. Those diseases that extend through the lymphatic system.
3. Those diseases that make themselves manifest through the nervous system.

I think that he has had some difficulty in using this as more than a tentative classification, as so many others have who have attempted classification of disease. Many of them have characteristics which do not lend themselves to easy classification because of their complexity. However, in accepting Dr. Otrich's classification, besides disease of the antrum of Highmore, I would place all of the infective diseases of the bony structures of the jaws in a prominent position for consideration. Of these, caries and necrosis of bone, with their resulting fistulae, so difficult to trace at times, as a result of periodontal infection, should be mentioned. Likewise pyorrheal infections, with their extensions to nose and throat, which are by no means rare.

The teeth have not been as responsible, in my experience, for disease of the antrum as they seem to have been in Dr. Otrich's experience, most of them being caused by infective processes extending from the nose. Other extensions that may be mentioned, especially those occurring in the lower jaw, are those about the third molar, simulating acute tonsillitis and peritonsillar abscess, and those cases of cellulitis, with necrosis of the softer tissues, extending into the pharynx, esophagus and even to the chest.

Diseases extending through the lymphatic system: As Dr. Otrich has stated, the defences erected by Nature about the nose, throat and mouth for the protection of the body in general, have been extensive. When these defenses have been broken down, however, the invasion of the body by infective agents seems to be in no degree retarded, but the defensive tissues become a source of added infection. The anatomical changes effected by the superficial lymphoid structures, such as tonsils and adenoids, is fairly well comprehended by this body, but the anatomical deformities of the mouth which may have an effect in the deformity of the nasal cavity may not be usually appreciated. Deflections of the septum, narrowing of the nares, occur as the result of mouth changes, and thus open up to infection this cavity with those associated with it.

Under this heading we may also mention septic conditions, both mild and severe, acute and chronic, such as follow indirectly the infections of the teeth, even if we do not know to what extent the lymphatic system and the blood stream participate. Often enough do we find acute and chronic lymphadenitis, chronic toxemias of various types, rheumatism, muscular and articular, the anemias, and

the arthritides of dental origin to make us very careful in our search for the causal factor.

Those diseases which make themselves manifest through the nervous system: These conditions present such a complexity and irregularity of symptoms, as illustrated in some degree by the cases related by Dr. Otrich, that little remains but to call your attention to certain general principles which may be of assistance in arriving at a diagnosis:

1. The more chronic and profound degenerative changes of the tooth-pulp are more liable to give rise to distant reflex pains than the acute.

2. These chronic inflammations or degenerations usually cause no direct dental symptoms.

3. The removal of an offending tooth-pulp, when found, may be followed by irritation of the nerve trunk supplying this tooth.

4. Temporal pain (headache) may arise from simple exposure of dentine.

5. Cystic condition of the jaws, with unerupted teeth, cause a large percentage of distant pain.

6. Impacted teeth cannot be disregarded.

7. Of the degenerative changes of the tooth, we must remember that hypercementosis, both internal and external, outnumber all other causes.

8. The most common disturbance appearing in other nerves than the fifth occurs in the eighth, or auditory, where deafness has been frequently reported as being of dental origin.

9. Motor disturbances of the seventh, or facial, must also be considered.

These referred pains call for the extreme of care in diagnosis on the part of the physician and dentist, for disease of the various sinuses, maxillary, frontal, ethmoid, sphenoid, also give rise to such varied phenomena that only after the most persistent search can the location of the irritation be discovered.

To maintain this discussion within reasonable limits one can only mention such diseases as pemphigus, purpura, scurvy, perforative ulcers due to the trophic disturbances of *tabes dorsalis* or the tubercular and syphilitic manifestations presenting in both fields.

At the present time pyorrhea alveolaris is attracting lively attention from both physicians and dentists. What the relations may be

between this disease and those of the nose, throat and ear is a matter difficult of prediction, but to an imaginative mind it offers an abundant opportunity for discovery.

In conclusion, I desire to offer my appreciation to Dr. Otrich for the presentation of his excellent paper on this subject to this body at this time.

Dr. G. C. Otrich, Belleville (closing the discussion) :

When I prepared this paper I did not think I was going to bring out such a spirited discussion. I wish to thank Mr. Schultz for the interest he has shown in my paper, apparent by the length of his discussion.

With reference to the question asked by Dr. Schultz regarding the maxillary sinus in the case in which the third molar was extracted and the second one treated, I will say that the socket from which the tooth was removed showed an inflammatory process around it to a certain extent. The patient remarked that it seemed as if some of the solution came through into his mouth, but there was not enough to determine that, and I then had my suspicion. It happened to be Sunday morning when he was treated. I did not give him close observation, but told him to return the following day. As the case belonged to an advertising dentist, I never saw the man any more.

With regard to transillumination, the reason I said it was negative was because the shadows on the two sides were so near alike that I was not positive of either one, and I think that was due to the density of the bone. In making a diagnosis of these conditions I do not think we can always be positive whether we use the x-ray or transillumination as an aid to diagnosis, therefore I always make a puncture.

As to the removal of adenoids, Dr. Schultz says that adenoids generally return, no matter how skillfully the operation is performed. Yes, in a number of cases that is true, but I think the technic employed in most of the cases for the removal of adenoids is poor. The men who do it are in too much of a hurry and try to operate without an anesthetic. One should pass the curette back until it touches the septum, press it back until he comes in contact with the bony resistance, then bring it down with a sweeping motion, keeping the curette well back, and in that way he can bring the edge of the curette close to the bone almost to the level of the line of the

edge of the soft palate. When you bring that out and turn the adenoid over you will observe it is not in shreds, but it will come out as a whole, and the most characteristic tissue that you find around it is the same that you find covering the tonsil when it is dissected out and is what is called the capsule. Whether it is a capsule or not, there is some difference of opinion. If you use a large enough curette, the percentage of cases in which the adenoids return will be slight. I have had one case of removal of adenoids in which I knew at the time there would be a recurrence, and I cautioned the parents to bring the child back in about a year for a further operation.

So far as Dr. Logan's paper is concerned, I want to thank him for it. In regard to extraction by physicians, I will say a great many patients came to us to be operated on whose mouths are in a filthy condition. I remember one woman who came to the hospital whose mouth was in a terribly filthy condition. I anesthetized her for the operation. After the operation I cleaned out her mouth, and when she woke up she wanted to know whether I had operated on her in the belly or in the mouth, and I told her both. (Laughter.)

I do not know of anything further I can say regarding this subject except to thank you for the courtesy you have shown me. I want to say this, however, that from a medical standpoint during the past three days I have picked up some valuable knowledge in more ways than one, and I hope you will all get after your local physicians. It is not the city practitioner but the rural medical practitioner who overlooks the conditions in the mouth. He looks at the tongue, but never looks at the teeth. If you will bear that in mind and impress upon the rural medical practitioner the importance of this, I think you will be doing your patients a great deal of good.

MINNESOTA STATE DENTAL ASSOCIATION, THIRTY-
SECOND ANNUAL MEETING, HELD AT
MINNEAPOLIS, JUNE 11, 12, 1915.

DISCUSSION OF THE LECTURE BY DR. W. G. CRANDALL ON "THE
PROPHYLACTIC AND ECONOMIC PHASES OF SCIENTIFIC
AMALGAM RESTORATIONS."

DR. OWRE:

I have nothing to say except that I would like to call to your attention an article on Chemical Constitution in the last *Cosmos* by McBane and another one by Bacher, which taken together with the things Dr. Crandall has told us this afternoon will be of great interest, I am sure.

DR. E. K. WEDELSTAEDT:

Your committee has seen fit to ask me to speak on this subject, but only in reference to those things which were of practical, everyday value, where amalgam was to be used for the making of dental operations.

The discussion of the scientific part of the subject has been assigned to Dr. Owre, a man who is very capable of doing it the justice which it merits.

You have heard what Dr. Crandall has said. He knows what he is talking about. Dr. Crandall and Dr. R. B. Wilson of St. Paul have, and they display, greatest ability in the making of amalgam operations. Indeed, it is a question if we have two other men in the profession who are their equals in the handling of amalgam, or who are able to make such works of art and beauty as do the two men just mentioned.

Amalgam is a plastic. All plastics are treacherous. For this reason and because of it every step regarding its use must be understood. If it is not understood nobody need look for that success from its use which is desired. The cavity preparation should be as perfectly made as possible, because that, so to speak, is the foundation. The erroneous idea that amalgam is "a cheap thing anyway and any old sort of a cavity preparation will answer,"

belongs to the past. Such ideas may be likened unto the freight cars so often seen standing on some seldom used side tracks which, when inspected, you will find have signs tacked on them that read, "Built prior to 1895," "Do not load," "Unsafe," "To be destroyed." It would be well for every man who uses amalgam to remember that we have too many ideas that originated prior to 1895 which are unsafe and they should long since have been destroyed.

Amalgam should only be placed in cavities which are the best an operator is able to prepare. And yet, if the operator does not know how to properly mix, knead, wring, condense and then let the amalgam alone until crystallization has so far progressed that all danger from instrument movement has passed, why, that man, or any other man, need not look for success so far as this relates to the use of any plastic. You may understand all about mixing the alloy with mercury, knead it until it is of the proper consistency and condense the amalgam into the cavity until it is just as it should be; but if, at this stage, you begin fussing with it with a burnisher, too often your operation is ruined. It is ruined because all plastics are very resilient. You touch them on one side and they lift right up and away from the opposite margin. Too many men follow this faulty practice of continually fussing with some plastic after it has been condensed into the cavity. The doing of such things is a display of a non-understanding of the fundamentals as they relate to the use of amalgam. And, if you will pardon me, there seems to be too many just such displays and that about all the time and these are too often made by men who should know better.

Perhaps, if what has just been said is illustrated, it may be the means of having you think over it and then make the so necessary alterations. How many men buy a pound of alloy at once and imagine that the last in the bottle is equally as good as the first used therefrom? Now, this is all wrong, because alloy constantly deteriorates with age. The better way is to pay pound rates and have fresh alloy sent as you may need it.

Next, how many men are guilty of mixing the alloy with mercury and then on finding the amalgam is either too soft or too dry, add more mercury or more alloy. Do you not know that the doing of either of these things ruins that special mix of amalgam? It does, and therefore neither should be done.

On the other hand, if the mix of amalgam is too soft do not

add more alloy, but throw that mix away and mix a fresh mass. Do not add more mercury to a mass of amalgam which has been mixed too dry; throw it away and mix a fresh mass. Such fussing with amalgam ruins it. If you wish to obtain the best results from the use of amalgam there must be a close adherence to the fundamental principles or else you do not obtain what you should.

You cannot obtain what you wish unless you have the proper instruments for condensing the amalgam. The idea which is so prevalent, that anything will answer with which to condense amalgam, is most faulty. Twenty years ago the results of scientific investigation showed all too plainly what was necessary to do to obtain the best results.

As a result of faulty teaching, not five per cent of the men who are in the dental profession feel that where amalgam operations are to be made the rubber dam should be adjusted. My time is too valuable to spend it in discussing what every man should know. If a thing is worth doing, it is worth doing well or not at all.

It is only necessary to say that the best results in the use of all materials for the making of dental operations are always obtained amid the best possible environment. And the best possible environment is the one given us where the rubber dam is adjusted.

In conclusion, allow me to say, "Gold foil is king." Gold foil has always been the king of all materials for the making of dental operations. Gold foil should always be used wherever and whenever it is possible to use it and obtain the best results. There are many conditions where gold foil cannot be used as successfully as something else, and that something else is amalgam.

Amalgam is next best to gold foil, provided it is intelligently used. In certain selective positions inlay operations are indicated. In other positions, and for a certain class of people, cements are necessary to use. In other positions gutta percha may be used. There should never be any question in the mind of a well developed dental specialist regarding what will answer best for the case before him, because he should know at a glance what will naturally tend to prolong the usefulness of that tooth for the greatest length of time possible. Any man who so considers the dental operations which he makes does not go very far wrong.

Use all things, but hold fast to that which is good.

WISCONSIN STATE DENTAL SOCIETY, FORTY-NINTH
ANNUAL MEETING, HELD AT OCONOMOWOC,
JULY 13-15, 1915.

DISCUSSION OF THE PAPER BY DR. W. T. HARDY ON "DENTAL
LEGISLATION."

DR. G. A. STRATTON, Oshkosh:

Mr. President, Members of the Wisconsin State Dental Society, Ladies and Gentlemen: Dr. Hardy has said that he hoped the paper would bring out a full discussion. However, I feel that the paper is so complete and so extensive in its scope that it will only be possible to discuss a few of the points of greatest interest. Dr. Hardy has given a good paper and he deserves great praise for it and especially for the good work he has done for dental legislation and dental education, which has enabled him to write such a paper. We have a good dental law in this state and we should be proud of it. It is, as the essayist has said, been taken from the laws of other states, but those who have been active in getting our laws passed have taken from the laws of other states only that which was best and most needful here in Wisconsin. The essayist has explained why so much work is necessary to pass a law and how this work nearly all falls upon the state board. This does not seem right and I think the legislative committee which is suggested would be an excellent thing. You may know what a narrow escape we have had from having a very inferior bill on dentistry passed and I venture to say that the reason was that not one-twentieth of the members of the state society knew anything about it. I think it wise that we have a committee as suggested, whose duty should be not only to use their own legislative influence but to keep the society at large informed so that we may individually use what power we have. And ladies and gentlemen, we have power—much more than we know anything about. The only trouble is that our legislative power is not organized and until it is the few on the state board must carry our legislative burden. For the present we may do much to help by sending letters and telegrams to our local representative and thereby make as much "clatter" as possible. In speaking of the present bill Dr. Hardy said that a compromise had to be made in certain

portions which related to powers of the board to revoke licenses. I do not see how in this case our state board is different from some of the commissions. At least the method of making complaints through the district attorney's office will not be satisfactory. As I understand it, with the industrial commission, all you have to do is to write out a complaint on a regular blank for that purpose and send it to them. Then they send a blank to the person complained of and he writes out his defense also on a regular blank. The commission then compares the complaint and the defense and if the case has merit, a date is set for a hearing. Why should not the dental board have the same power? In regard to high school credentials for entrance to dental colleges I think the idea of the board passing on these credentials before the student enters college is a good one. It is a great help toward making the finished dentist an educated gentleman. The idea of allowing juniors in college to be examined on subjects which they have completed is also a good one. I am sure the plan would have been very acceptable to me when I was at college. The law in regard to the revocation of licenses for non-payment of registration fees is certainly just in allowing one year and nine months for payment. Dr. Hardy says that he is not ready to say whether he is in favor of a universal dental law and reciprocity or not; his point being that delinquents would go from state to state and thereby evade the law. Would it not be possible to limit the number of changes one might make and thereby evade that objection? The four years' course in dentistry is spoken of as being advocated and will be in force not later than the fall of 1917. It seems a necessity at this time to increase the dental curriculum especially since research in pathology has discovered so many diseases originating in the mouth. This suggestion is also a reminder of the extra work we must do to compete professionally with the coming crop of better trained men. The balance of the paper deals with state board business which is very interesting. It shows that conditions in Wisconsin are good and far above the average as compared with other states. With the few exceptions mentioned by Dr. Hardy the law is fairly satisfactory, at least good enough to give us reciprocity with seven states. We do not want our legislature workers to cease their labors now, but to make another try to

pass the ideal law and in return let us promise a great, united and organized assistance. I thank you.

DR. HARDY (closing the discussion):

Mr. President, Ladies and Gentlemen: I meant to explain the status of 182 S as it is today in its amended and compromised form. The bill after passing the Senate was referred in the assembly to the public welfare committee who recommended indefinite postponement although no opposition appeared. Subsequently through strenuous efforts it was referred to the finance committee, where the bill found friends and I hope will receive a favorable report.

The original bill, as suggested by Dr. Stratton, provided that the board should constitute a trial body similar to the fire and police commission of Milwaukee, whose material and decision were subject to review by the Circuit Court. In the substituted form, however, it is practically a copy of the medical law.

Regarding the organization for this legislation I am not sure that we need any more organization than we have, but it should be understood that when the legislative committee sends a letter or telegram to the different component societies asking the members for help in a certain direction they should respond quickly by letter or telegram to their senator and assemblyman at Madison asking him to vote in accordance with whatever the committee has recommended. In this way, I am sure, we will have no trouble in getting what we want.

It is this lack of interest and no request from the profession which makes the legislature think there is no demand for such legislation.

The advertising dentists are quick to claim that the dentists who do not belong to the state society are in sympathy with them, and our strength is measured by our own numerical expressions which this year have been very small compared to what they should be and even compared to what the advertisers produced.

I do not agree with Dr. Stratton that the one dollar registration fee should be abolished, because physicians do not have to pay one. As a matter of fact most any one can practice medicine

in some of its varied forms, from a midwife to the chiropractic without a license.

I believe Wisconsin is comparatively free of unlicensed dentists principally because of the annual registration which enables the board to keep track of where each man is. If an intruder comes into a locality it usually is not long under the registration plan before he is found out, complained of, and gotten rid of before he gets firmly established.

Many states which have not had any dental registration have recently adopted it. Michigan and Indiana most recently, they having found it necessary in order to prevent unlicensed men getting in.

I will say to Dr. Stratton that the reason I do not care to discuss the feasibility of a national board is because I should want to see the law creating such a board studied very carefully before it was put in operation, thus throwing the gates wide open to a general reciprocity or national board having power to say who could practice in any state unrestricted.

Now that Bill 182 S is in the hands of the assembly finance committee and as we need all the help we can secure I hope every member who can will get in touch with his assemblyman and urge its passage. It passed the Senate 22 to 1.



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EDITORIAL.

AN EMERGENCY SPLINT FOR USE IN WAR.

Through the kindness of my good friend, Dr. William Dunn of Florence, Italy, I am permitted to present the illustrations of an appliance devised by Prof. Luigi Arnone of the Dental Department of the University of Florence for the relief of injured soldiers. It is an emergency splint to immobilize fractured man-

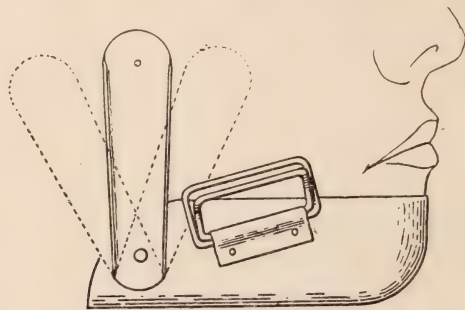


Fig. 1.

dibles, maxillaries or zygomas; and it can be applied in a few seconds by anyone, even by the wounded man himself. It is essentially a "first aid" appliance at the front, and is intended to obviate the appalling suffering and complications brought on when these wounds are not immediately attended to.

In the outfit sent me by Dr. Dunn, which is a duplicate of those furnished the Italian troops by Prof. Arnone, I find, in

addition to the metal splint, web bandages, gauze padding, etc., as illustrated, a rubber bulb which serves the wounded man in good stead for feeding and drinking purposes, and a pad of paper and pencil with which he may write to express his wants.

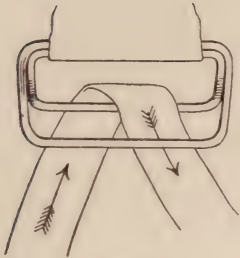


Fig. 2.

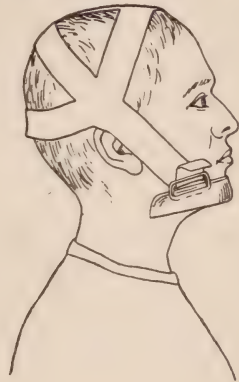


Fig. 3.

Manifestly these are essential, as the fixation of the jaws by the splint and bandage would otherwise prevent feeding and phonation.

The ingeniousness of this appliance must be apparent to



Fig. 4.

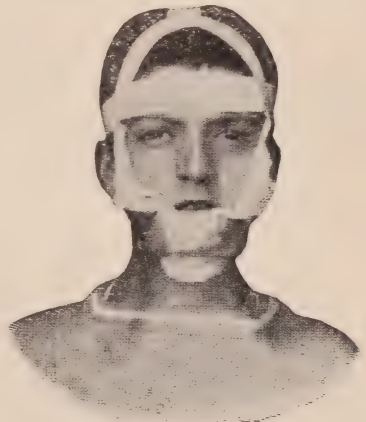


Fig. 5.

anyone, and I am informed by Dr. Dunn that it has been well received and greatly appreciated by those at the front. Already Prof. Arnone has made and sent out more than seventy of these

outfits to the army, all carefully boxed and sterilized. We congratulate our Italian confrere on this evidence not only of his ingenuity but of his unselfish patriotism as well. It is a splendid achievement for the relief of suffering among his fellowmen.

Since the foregoing was written we have received a paper on fractures by Prof. Dr. Arrigo Piperno of Rome, who is attached to the Red Cross Service in Italy, and who is doing excellent work along this line. This paper relates to the methods employed for permanent splinting till the fractures are healed, thereby supplementing the emergency work of Prof. Arnone. It will thus be seen that our Italian colleagues are fully alive to the needs of expert dental service among the wounded men of the army, and are rising to the necessities of the case in a splendid manner. We have no doubt that the profession of other countries at war are doing a similar service for the wounded, and we fully believe that one result of the great conflict now going on will be a fuller recognition on the part of military officials and the medical profession of the real value of the services of the dentist. So great has become the demand for these services among the enlisted men that the dentists now at the front are almost overwhelmed. War means self sacrifice, and if there is any benefit in war it is this—the teaching of self sacrifice.

BOOK REVIEWS.

THE SIMPLEX HANDBOOK OF DENTAL MATERIA AND THERAPEUTICS.

By *Wesley Barritt, Ph. C., L. D. S. Eng.*, member of the Pharmaceutical Society of Great Britain, Dental Surgeon to the French Hospital, and *Alfred Barritt, L. D. S. Eng.*, Demonstrator of Histology, National Dental Hospital. 340 pages. Price \$1.75 net. Published by Peter Reilly, Philadelphia.

This book consists of five parts, *Materia Medica*, *Therapeutics*, *Prescribing*, *Histological Section*, and *Glossary*. The classification of agents used in dental histology is a new feature as presented in this volume, and it will be found a very useful addition to the work. The agents treated in the book are arranged alphabetically which is a great aid in referring to any particular drug. Each agent is listed under the heads of "Name," "Latin Nomenclature," "Characters," "Use," "Dose," and "Description."

The work is really a ready-reference book on the various sub-

jects treated, and will be found most convenient for students and busy practitioners.

PRACTICAL HINTS DEPARTMENT.

This department is for readers who are busy. Articles, to be available, must be brief—not more than 200 words in length. Any practical idea is welcomed, and due credit will be given for each article published. Every practitioner has many little wrinkles that help him out in daily practice, and if they help him they will help others. Thus they should be published. Send in your practical hints to THE DENTAL REVIEW, 810 Masonic Temple, Chicago, Ill.

A Time-Saving Hint:—When treating, and in some cases, when filling, an upper tooth, excepting the second and third molars, a cloth napkin can be secured with a clamp to a tooth distally located from the one to be operated upon, and by placing a cotton roll under the lip or cheek, as the case may be, all moisture is excluded from the field of operation for a sufficient length of time to enable you to render the service required. This method can be adopted in most cases, but of course some cases cannot be managed in this way, requiring the rubber dam. Anyone making use of the napkin as indicated above will save much valuable time, and cause less discomfort to the patient.—*H. A. Cross, Chicago, Ill.*

Information Wanted:—Why is the lower jaw no longer known as a jaw, but a “mandible?” Is not the lower jaw a jaw as well as the upper? Is it not a sort of scientific fad? Is the dentist who fails to use it out of date? Up to quite a recent date the cuspid teeth were called “canines.” The idea of telling a young lady she had dog teeth in her mouth! The teeth were formerly known as the “superior” and “inferior”—terms denoting quality and not relative position, and dies were known as “male” and “female.”—*L. P. Haskell, Chicago, Ill.*

Setting Banded Crowns Painlessly:—In those cases where the gums are particularly sensitive the cementing of a banded crown is sometimes quite painful. If a small pellet of cotton about the size of the head of a pin is dipped in 95% phenol and passed with the pliers around the root just under the free margin of the gum a few times it will be found that the sensitiveness

is greatly diminished. Have at hand some absolute alcohol so that in case the phenol should flow on the tissues beyond the root the cauterizing effect of the phenol can be instantly checked with the alcohol.—*A. B.*

To Grind Natural Teeth Painlessly:—Much of the discomfort in the use of stones is occasioned by the jarring or vibration of the stone against the tooth. If the tooth is held firmly in the socket or against one wall of the socket with the thumb or finger of the left hand while grinding down enamel or opening cavities with stones it will minimize the discomfort immeasurably. Of course it is understood that all stones should run smoothly and true and that a stream of water should flow on them while cutting. If these precautions are taken, any ordinary case of grinding can be done painlessly.—*E. D.*

To Flow Solder Easily:—If the solder is cut into long strips instead of short pieces, it can be used to better advantage. Heat the case up, and taking hold of one end of the strip with tweezers, hold the other end close to the piece to be soldered and direct the flame on it. As it melts feed it down into the joints or wherever you wish it to flow. In this way you can see what you are doing, and the solder may be fed into a deep depression or built up into any desired bulk in precisely the form that is required. If the solder is not flowing properly, dip the heated end of the strip in powdered borax, and this will flux it and make it flow smoothly.—*J. W. J.*

Fitting Gold Crowns:—The heart of the gold crown lies in the adaptation. To attain exquisite fit of band, use 23k. (30g.) gold, the alloy of which should be equal parts copper and silver. Bring the carefully filed ends of the gold in perfect contact, end to end. Trace a line of flux along the joint and with blow pipe sweat together, giving a seamless band. Solder is superfluous. In making the occlusal surface allow the lower grade gold to somewhat overlap the band. I find this special gold of great advantage. It gives the soft tissues the benefit of almost pure noble metal, and mainly its value lies in the comparative ease in

approaching perfection in fitting, and used in this manner is entirely dependable in every way.—*Clarence H. Wright, Chicago, Ill.*

Anatomical Articulation:—Much is being written and illustrated with all sorts of diagrams, showing how the jaw moves, etc., which is all right so far as it applies to the natural teeth; but practically in relation to artificial dentures, especially in cases of flat lower jaws, is of no import whatever. The fact that it is impossible to masticate tough meat except in favorable conditions is owing to the impracticability of *grinding*. The movement is up and down, and there you are. I have often wondered how many of these serious advocates of anatomical articulation are wearing full sets of artificial dentures, especially with flat lower jaws, and also with flat upper jaws where there is nothing to prevent the sliding of the plates in the attempt to grind. Science is all right in theory, but cannot always be applied practically. If you do not believe it, try it in your own mouth—like myself.—*L. P. Haskell, Chicago, Ill.*

Extracting a Post from a Frail Root:—In extracting a post from a frail root with a post puller there is always danger of splitting the root. The likelihood of this happening may be reduced to the minimum by taking a piece of twenty-eight-gauge German silver plate, cut a hole through it large enough to pass over the post and trim into a disk about the size of the root face. This disk may then be placed on the root with post projecting through its center. The post puller may then be placed in position and as it is tightened the part of the instrument which is intended to bear on the root rests against the metal disk and does not slip or spread and the post may be drawn with safety. If the face of the root is uneven from decay, a bit of base-plate gutta percha may be molded into the cavity, the disk pressed into place and chilled with cold water, giving an even base for the instrument to press against.—*J. A. Bullard, Chicago, Ill.*

Inlays Cast Against Wax:—Using Taggart's inlay wax and investment—Wax melts and flows freely at between 170 and 180 degrees. In twenty minutes after pouring investment, at a heat of not over 212 degrees, wax will disappear completely, leaving

mould perfectly clean with surfaces covered with a coating of wax, not to be measured, thinner than smallest amount of cement that can be placed between inlay and cavity wall. It is essential that this thin wax coating receives the hot metal. At a *very low heat*, not enough to change the color of the investment (caused by burning the wax), drive off all moisture. Test with cold dry mirror and when vapor will leave mirror in two or three seconds, remove case and allow to cool before casting. Experience enables one to time the heating process within a minute or two. When melting gold do not heat ring. When gold is hot enough to cast, the hot top of the investment coming in contact with wet, pulpy asbestos generates sufficient steam to make perfect casts, when using steam machines. Pressure, air, gas, steam or centrifugal force must be used. Wax in the investment makes it impossible to use suction machines. The molten metal of any karat, including scrap gold, crowns and bridges, when cast against the wax-covered walls of the mould, carbonizes the wax, excludes the air and results in clean, bright, smooth inlays, sharp margins and absolutely no oxidation. Water and brush only necessary to clean them. The thin coating of wax covering the mould makes the inlay enough smaller to overcome the expansion of the investment resulting in inlays that do not bind, but go to place, especially at the gingival, which heretofore has been the imperfect margin.—*Charles B. Mead, Rockford, Ill.*

Anchoring Inlays:—There are at least three good methods to connect a post and an inlay, which forms the metal part of a combination filling (cast gold with a silicate front in anterior teeth). 1. A gold post, continuous with the inlay itself; they are cast from a wax model in one piece. 2. A platino-irridium wire post, united with the inlay, after this has been cast. At the cavity side of the inlay, opposite the root canal, an opening is left in the gold. The post, while in the root canal, can be attached to the inlay in this hole with sticky wax. Removed in the proper relation, they are invested and soldered together. 3. A tube of platinum, No. 30, filled with solder. The inlay must have a short projection of the same thickness as the lumen of the tube at the cavity side towards the root canal. It fits into the tube, when

this is placed in the enlarged root canal and the parts can be withdrawn together. Invested, the tube is filled with solder and in the meantime attached to the inlay. Most inlays for this combination filling method, if they are used for cavities involving one or both incisal angles or the entire incisal edge, need a post in the root canal for retention; each of these three methods of attaching them to the inlays has its own indication.—*M. J. Homan, Arnhem, Holland.*

MEMORANDA.

THE MICHIGAN DENTAL JOURNAL.

This is a new publication issued by the First District Dental Society, Detroit, Mich. The editors are Bion R. East, James D. Bentley and George Bailey Harris. The first issue, November, 1915, is a very creditable publication, and we wish it all success.

AMERICAN INSTITUTE OF DENTAL TEACHERS.

The annual meeting of the American Institute of Dental Teachers will be held at Hotel Radisson, Minneapolis, Minn., January 25, 26 and 27, 1916. There will be a number of interesting papers, reports and ~~displays~~ ^{discussions} by prominent dental educators. All dental teachers are ~~expected~~ ^{welcome} present. J. F. BIDDLE, Secretary, 517 Arch Street, N. S., ~~Pittsburgh, Pa.~~ ^{Pittsburgh, Pa.}

MARQUETTE UNIVERSITY DENTAL ALUMNI ASSOCIATION.

The tenth annual clinic, manufacturers' and dealers' exhibit of the Marquette University Dental Alumni Association, will be held at the Milwaukee Auditorium, February 16, 17 and 18, 1916. The officers and committees are planning a program for this meeting which they feel sure will be of interest to every dental practitioner. Try and arrange to be with us at this meeting.—V. A. Smith, Secretary.

DR. H. J. BURKHART ACCEPTS THE DIRECTORSHIP OF THE EASTERN INSTITUTE.

A bit of information of the utmost importance, so far as the welfare of the Eastman benefaction in Rochester is concerned, has just come to hand. Dr. H. J. Burkhart of Batavia, N. Y., has accepted the position of director, and this at once places this institution on the list of assured successes, in so far as relates to its management.

Dr. Burkhart's well known executive ability will find ample scope in this enterprise, and the movement toward the better care of the teeth of children will receive a decided impetus thereby. Our congratulations are herewith offered to Dr. Burkhart, and particularly to the Eastman Dispensary.

NAME ADVISORY BOARD FOR TEXAS DENTAL COLLEGE.

At a recent meeting of the Dallas County Dental Society attended by members of the faculty of the State Dental College, a resolution was unanimously adopted accepting a proposition whereby the management and direction of the college is placed in the hands of an advisory board composed of Dallas members of the county society. This board was named as follows: Drs. Bush Jones, J. W. Halsell, A. L. Frew, S. L. Barron, J. R. Beachum, G. Waller Staples, J. J. Simmons and C. L. Morey. After the meeting of

the county society the advisory board went into session and elected the following officers: Dr. J. J. Simmons, president; Dr. Bush Jones, vice-president; Dr. C. L. Morey, secretary; Dr. J. W. Halsell and Dr. A. L. Frew, new members of board of directors. The proposition to the above effect was made by members of the faculty of the State Dental College to a committee of the county society and was generally discussed at last night's meeting and met with unanimous indorsement. The board will take charge of the management of the college at once.

POST-GRADUATE SCHOOL OF ORTHODONTIA.

By the opening of a Post-Graduate School of Orthodontia, the Forsyth Dental Infirmary for Children is fulfilling one more of its functions as conceived in its original plans, and one which was characterized by President Emeritus Charles W. Eliot, in his address at the dedication exercises, as one of its most important influential duties, the education of the profession and the public.

While the school is not the first to be established in this important field of dentistry, it is the first to adopt a full academic year of instruction. The curriculum is comprehensive and includes not only the technical dental subjects, but also all of the allied medical branches that have a bearing on the development of the child. The unsurpassed clinical facilities of the institution, which are already demonstrated, will provide the student ample opportunity to acquire the practical experience necessary. Emphasis will be laid on preventive orthodontia. The faculty includes not only local men prominent in their branches but also a large number of specialists from the East and Middle West.

when cast again.

DISTINGUISHED VISITORS IN CHICAGO.

During the present autumn Chicago has been favored by the presence of many distinguished men from other countries, and other parts of our own country. Dr. E. R. Magnus of Sydney, Australia, came to Chicago following the Panama-Pacific Dental Congress, and was entertained by his friends every minute of his stay, which was all too short. Dr. I. Nakahara, president of the Nippon Dental College, of Tokio, Japan, made his first visit to America and left behind many newly made friends. Dr. R. Anema of Paris, France, was here in the interest of the proposed American Hospital for wounds of the face and jaws. Dr. J. R. Callahan of Cincinnati came to read a paper before the Chicago Dental Society at the October meeting. Dr. A. N. Davis of Berlin, Germany, formerly of America, who has made a great name for himself abroad, came back to his old home for a vacation. Dr. De Boer of Batavia, Java, is here for a few months' postgraduate work, and to renew friendships made while a student several years ago. These and many others have favored Chicago with their presence, and Chicago has been glad to bid them welcome.

ANNUAL MEETING OF THE DENTAL PROTECTIVE ASSOCIATION OF THE UNITED STATES.

The annual meeting of the Dental Protective Association of the United States will be held on Monday, December 20, 1915, at 4 p. m., at the Hotel La Salle, Chicago, Illinois. The report of the secretary and treasurer will be read, a board of directors will be elected, and other important business transacted. As many of the members as can conveniently do so should arrange to attend the annual meeting.

It should be remembered that this is the old reliable Dental Protective Association, which has stood between its members and *patent abuse* for the past twenty-seven years. At the present time there are eight thousand members of the Association in good standing. These are located in almost every city in the United States. Members of the profession who desire

to join the Association should write the secretary for necessary blanks, etc.

By order of the board of directors.

J. G. REID, President.

J. P. BUCKLEY, Vice-President and Secretary.

D. M. GALLIE, Treasurer.

PANAMA-PACIFIC DENTAL CONGRESS.

The Panama-Pacific Dental Congress has passed into history, and in accordance with the opinion very generally expressed by those in attendance, the meeting was a decided success.

The Pacific Dental Congress Commission of 1915, the corporation now in charge of all matters relating to the congress, and the publications of the transactions, desires to announce that a copy of the complete transactions, when published, and a copy of the official souvenir program, will be sent to anyone making application therefor to the secretary of the commission, Dr. Arthur M. Flood, 240 Stockton street, San Francisco, Cal., and forwarding the fee of \$10.

Those subscribing for these extra copies of the transactions cannot be regarded as being members of the congress, not having applied for membership before the meeting, or being in attendance at the same, but we believe these transactions will be a very valuable addition to the history of dentistry, and the souvenir program, containing as it does many items of historical interest and value, will be acceptable to any member of the profession.

PACIFIC DENTAL CONGRESS COMMISSION OF 1915,

Arthur M. Flood, D. D. S., Secretary.

AN INVITATION.

The National Dental Association and all ethical dentists will be heartily welcomed by the profession, the business men and the citizens of Louisville at the twentieth annual convention of this organization, to be held in our city four days, commencing Tuesday, July 25, 1916. The First Regiment Armory in whose 54,000 square feet of floor space the exhibition will be held, the public school building in whose commodious rooms the clinics will be held, Keith's and Macauley's theaters, the auditoriums of the Seelbach and Waterson hotels where sectional meetings will be held, are within a radius of 100 yards, and with the approval of President Hinman the most convenient arrangements ever provided have been made for the forthcoming dental convention. The Kentucky Dental Association will hold its annual meeting to close Monday, July 24. The National Association of Dental Examiners will hold its convention, arranging to close Monday, July 24. The three Greek letter dental fraternities will hold their annual conventions Monday, July 24. Louisville is the ideal convention city of America, convenient of access from all points of the country, abundant in its hotel accommodations and affording innumerable side attractions of interest. The local committees are planning a series of entertainments commensurate with Kentucky's reputation for hospitality, and the ladies, especially, who attend the convention will be guests at innumerable social functions.

LOCAL COMMITTEE.

W. T. Farrar, Chairman, 519 Starks Building, Louisville, Ky.; H. B. Tilsen, Max M. Eble, W. M. Randall, R. F. Canine, J. W. Clark, E. A. R. Torsch, I. H. Harrington, W. E. Grant, Ed M. Kettig, John H. Buschemeyer, mayor of Louisville; Fred W. Keisker, president, Louisville Convention and Publicity League; Thos. J. Smith, president, Louisville Board of Trade; Richard H. Menefee, president, Louisville Commercial Club; W. H. Stacy, president, Kentucky State Dental Association.

RESOLUTIONS PASSED BY THE ST. LOUIS DENTAL SOCIETY.

In compliance with the Law of the Universe, which limits man's stay upon earth, Dr. Greene Vardiman Black was called to the Great Beyond on

Tuesday, August 31, 1915, at Walnut Lodge, Jacksonville, Ill., the home of his childhood.

The Fates, whose office is to spin the thread of human destiny, were wise in extending his career beyond the allotted three score years and ten, that we might benefit to the utmost by the bountiful fruits of his indefatigable labors.

In the passing of this superior intellect, Dentistry lost the greatest single benefactor in the history of the profession. Dr. Black was highly honored for his brilliant achievements in science, tendered to his contemporaries generously and without thought of material reward. He was sincerely loved for his kindly helpfulness, granted indiscriminately to all who approached him.

His early influence in our city began with his affiliation with the Missouri State Dental Association at its inception in 1866 and continued with the Missouri Dental College, where he received the honorary degree of D. D. S. in 1877. Here he taught histology, pathology and operative dentistry from 1870 to 1880. Thus we of St. Louis have long claimed him as one of us and have special cause to mourn the dimming of his beacon light; therefore, be it

Resolved, That we, the members of the St. Louis Dental Society, in meeting assembled, with a full realization of the magnitude of our loss, give heartfelt expression to our grief and tender our profound sympathy to the bereaved family, and be it further

Resolved, That a copy of these resolutions be spread upon the minutes of the society and a copy sent to the family and to the professional journals for publication. Committee: H. F. D'OENCH, J. F. AUSTIN, J. D. WHITE.

THE TRI-STATE POST-GRADUATE DENTAL MEETING—MISSOURI, KANSAS AND OKLAHOMA.

The Dental Societies of Kansas, Oklahoma and Missouri wish to announce to the dental profession that they will conduct a joint post-graduate dental meeting in Kansas City, Mo., the week of March 20 to 26, 1916.

In making this announcement we believe it to be the most important step, from a dental educational standpoint, ever undertaken by any state dental societies. The meeting is to be conducted along the lines of the "Oklahoma Way" or the "Teaching System."

At this writing several of the foremost teachers of the dental profession have been secured for lecturers, among whom are: Dr. M. L. Rhein of New York, Dr. Richard Reithmüller of Philadelphia, Dr. C. N. Johnson of Chicago, Dr. Weston A. Price of Cleveland, Dr. Thomas P. Hinman of Atlanta, Dr. Forrest H. Orton of St. Paul, Dr. J. P. Buckley of Chicago.

Some noted medical man's name will be added to this list of lecturers.

The meeting will be conducted almost exclusively on the lecture plan, and when possible each lecture will be fully illustrated. One half day will be devoted to general clinics.

Dr. Rhein will take up the subject of root canal work; Dr. Reithmüller, anesthesia and analgesia, both local and general; Dr. Johnson, some phases of operative dentistry; Dr. Price, some recent research work; Dr. Hinman, plastics (amalgam and cements); Dr. Orton, some phases of crown and bridge work; and Dr. Buckley, materia medica—therapeutics and pyorrhea.

Each person attending this meeting will be required to pay a membership fee of five dollars, and only dentists in good standing in their state society will be eligible to take this post-graduate course.

The Tri-State Bulletin and a program will be mailed upon request to anyone desiring to keep posted on the details of this event. For any information, address the secretary of the organization committee.

Tri-State Organization Committee: Charles Channing Allen, chairman, Tenth street and Troost avenue, Kansas City, Mo.; C. R. Lawrence, secretary-treasurer, Enid, Okla.; J. D. White, Frisco Building, St. Louis, Mo.; C. A. Martin, Winfield, Kan.; W. E. Flesher, Frederick, Okla.; L. D. Mitchell, Arkansas City, Kan.

C. R. LAWRENCE, Secretary.

